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Telephony

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TELEPHONE INDUSTRY
SINCE 1901

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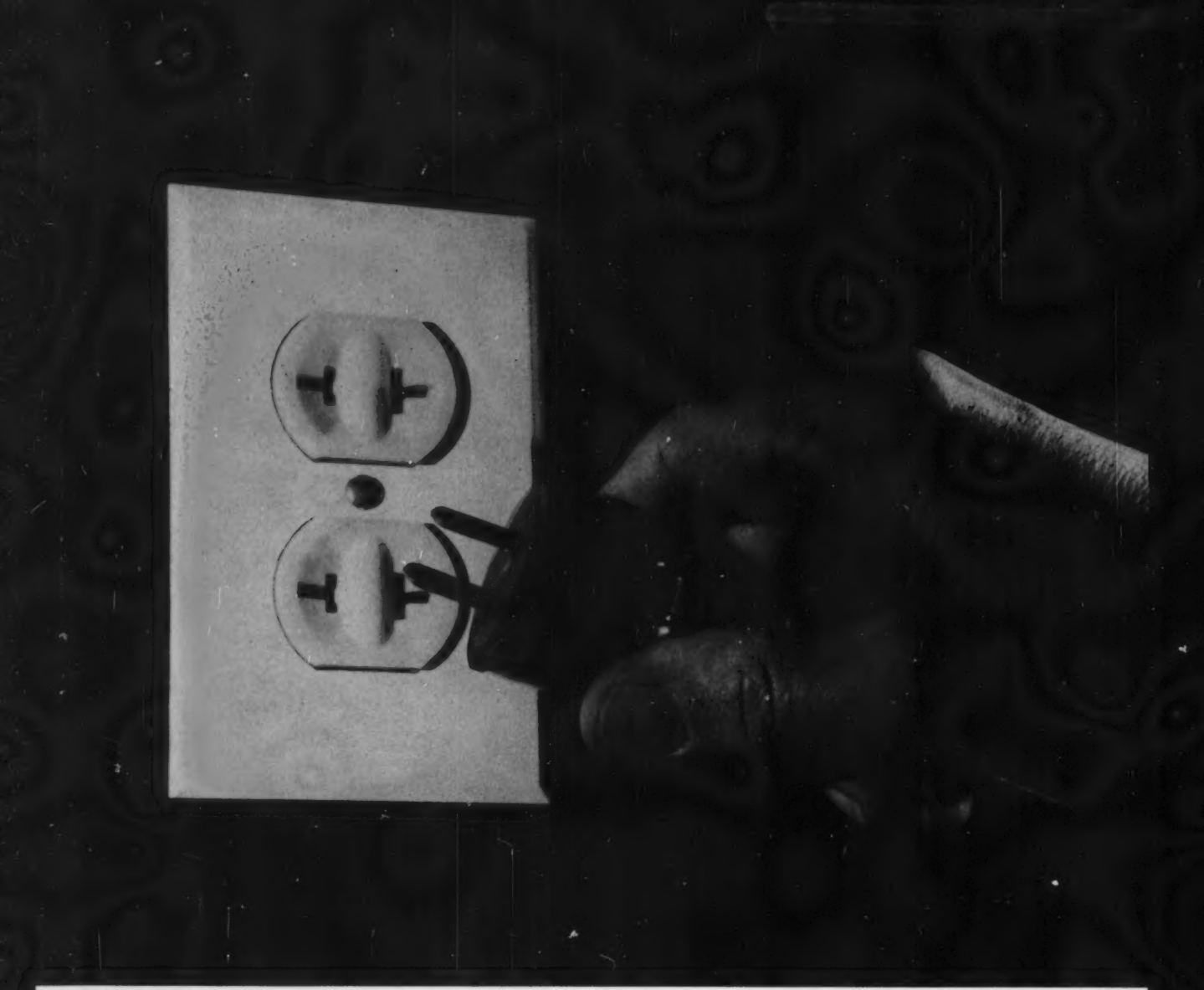
Guaranteed Circulation This Issue
13,173 of Which 12,649 Is Paid

MANAGEMENT GRADUATES

Participants in USITA's Management Development Course at the University of Kansas give ear during commencement ceremony. For identifications and report on program, see page 34.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING



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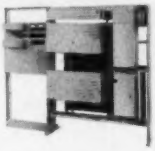
1. *The Stromberg-Carlson F-40*: a compact, mobile "package" with capacity of up to 40 lines and 10 trunks (8 central office, 2 information). The handsome cabinet, finished in office gray, can be placed anywhere in your subscribers' offices. It takes only 8 square feet of space. Thick insulation inside doors and sides makes the unit virtually noise-free. Also furnished without cabinet where soundproofing is not needed.



2. *The Stromberg-Carlson F-80*: rack-mounted without cabinet, like the F-40 in principle and operation, offering the same subscriber benefits—but with twice the capacity.

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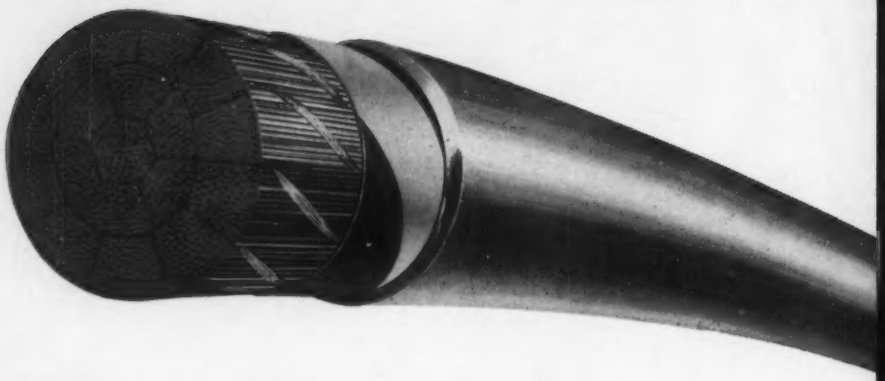
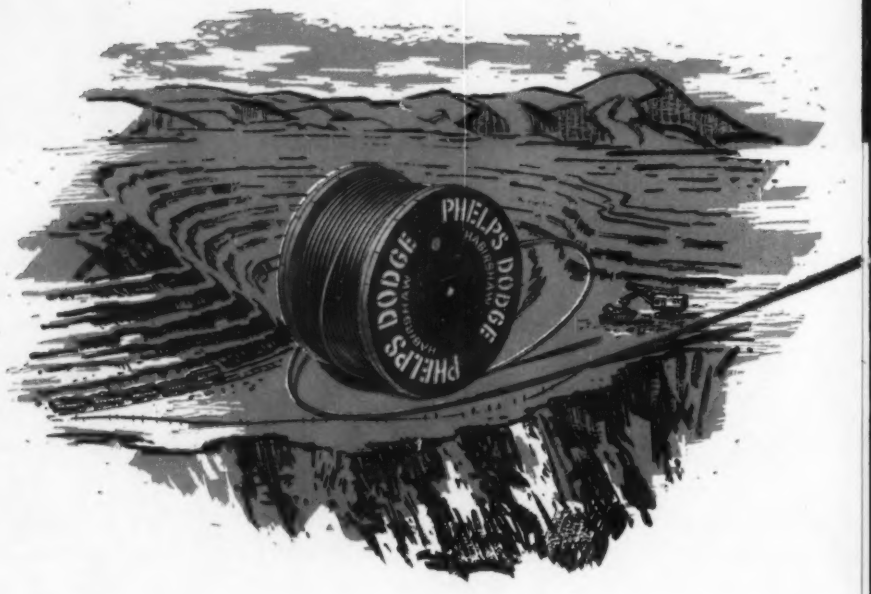


PHELPS DODGE TELEPHONE WIRE AND THE "MINE-TO-MARKET" QUALITY



Paper-Insulated Lead-Sheathed Telephone Cable

CABLE LINE!

This Phelps Dodge telephone cable combines the superior transmission characteristics of paper insulation with the durability and moisture resistance of lead. It is backed by Phelps Dodge's extensive research and manufacturing experience in the paper-lead cable field.

The controlled craftsmanship and quality of this paper-lead cable are typical of the entire line of Phelps Dodge telephone wires and cables, including:

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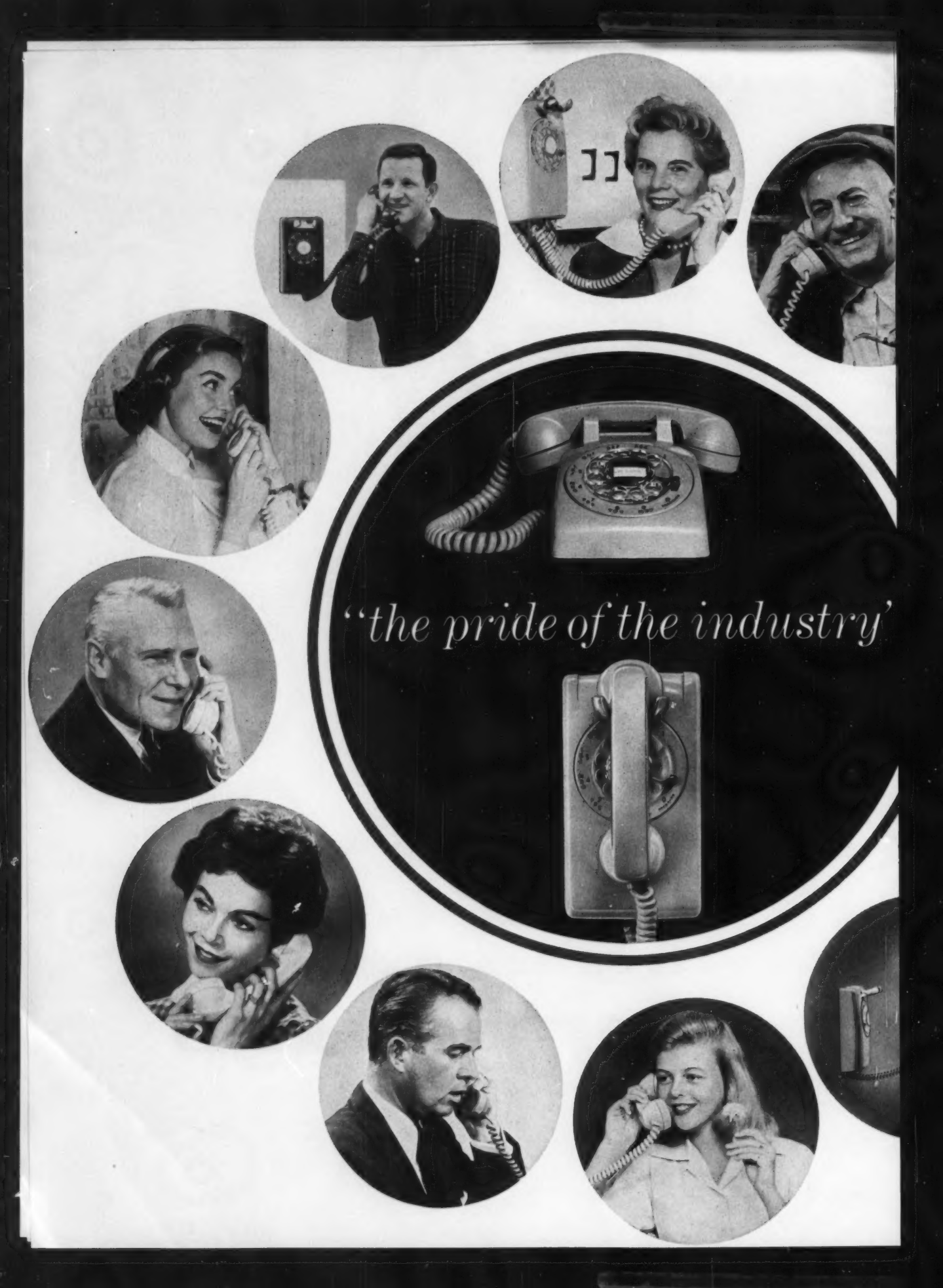
"the pride of the industry"

Kellogg's K-500 series telephone has been voted one of the "ten best contemporary designs" in a poll conducted by the Institute of Design of the Illinois Institute of Technology.

The K-500 also represents engineering excellence —every part and component a masterpiece of precision skill . . . tested under the most exacting conditions to meet the rigid requirements for lasting performance . . . making the Kellogg K-500 an instrument of unmatched quality and beauty . . . truly the pride of the industry.

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Give your subscribers a choice of the smart new wall or standard desk models in the 500 series—in a selection of 10 attractive colors to match any home or office decor: red, yellow, green, ivory, rose pink, aqua blue, light beige, light gray, white, black.

Place your yearly order for K-500's in advance. Kellogg will ship the number of phones you need each month at the overall quantity discount. Ask your local Kellogg representative about this and other K-500 benefits.

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ILLINOIS: 4600 So. Tripp Ave., Chicago 32, Illinois, CLiffside 4-4300.
KANSAS: 7th & Sunshine Road, Kansas City 15, Kansas, MAyfair 1-4418.
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EXPORT: 187 Prospect Street, Passaic, N. J., PRescott 3-6100.

FLASHES AND PLUGS

SORRY, WRONG GENERATION. People can't be judged sight unseen from the quality of their speaking voices—at least not all the time.

One of the young ladies in an Ohio Bell Telephone Co. business office answered a call and decided from the small, soft, voice that the caller must be a child.

The Ohio Bell gal listened for awhile and decided it was a child testing her ability to make calls.

"How old are you little girl?" the representative said sweetly. The little voice said: "59."

•

HEADING IN THE WRONG DIRECTION. A telephone operator's husband was having quite some time getting into his shirt. Finally he complained:

"The laundry made a mistake and sent me the wrong shirt. The collar's so tight I can hardly breathe."

"It's your shirt all right," his spouse answered. "The only hitch is you've got your head through a button hole."

•

WINNER TAKES NOTHING. Recently, according to the story, an auto race was held in Prague, Czechoslovakia. There were only two contestants—an American Ford and a Soviet Moskvich. The Ford won hands down.

Reporting it to their fellow countrymen, the Prague newspapers stated: "The Soviet Moskvich placed second, while the American Ford came in next to last . . ."

•

BAREFOOT BOY. A car screeched to a halt at an intersection, barely missing a white-haired old lady.

But, instead of giving the driver a tongue-lashing, she recovered herself quickly, smiled sweetly, and pointed to a pair of baby shoes dangling from the speed demon's rear-view mirror.

"Young man," she asked, "why don't you put your shoes back on?"

•

BORINGEST OF THE BORERS. A utility pole-tester at Allenhurst, N. J. probably holds some kind of record for tenure on a boring job. He has had this job for the last 23 years.

His job? To bore holes in the poles to see how long they will last.

And as any other pole-tester would agree, while he is on the lookout for termites in those poles, he feels the woodpeckers are the champions of all borers!

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

August 29, 1959

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Gimbels' converts unused doorway into attractive paystation location with SHERRON STAINLESS STEEL MULTIPLES

One of many reasons why Sherron steel booths belong in just about any location is their adaptability.

Here, for example, is a Sherron stainless steel multiple neatly fitted into a doorway of the great Gimbel store in Philadelphia.

Gleaming, impressive, this Sherron multiple has transformed an otherwise drab, unused area into an attractive and constructive public service.

Here again is proof positive of the fact that, when it comes to making the most of a paystation location, Sherron stainless steel booths are in a class by themselves.

No other booths are so readily suited to create — or dress up — a paystation location. Or as effective in promoting paystation patronage.

SEE OUR CATALOG IN SWEET'S
INDEPENDENT
Sherron ACOUSTIC & SEE-THRU

There's a Sherron booth for every location and budget in either zinc coated, cold rolled or stainless steel.

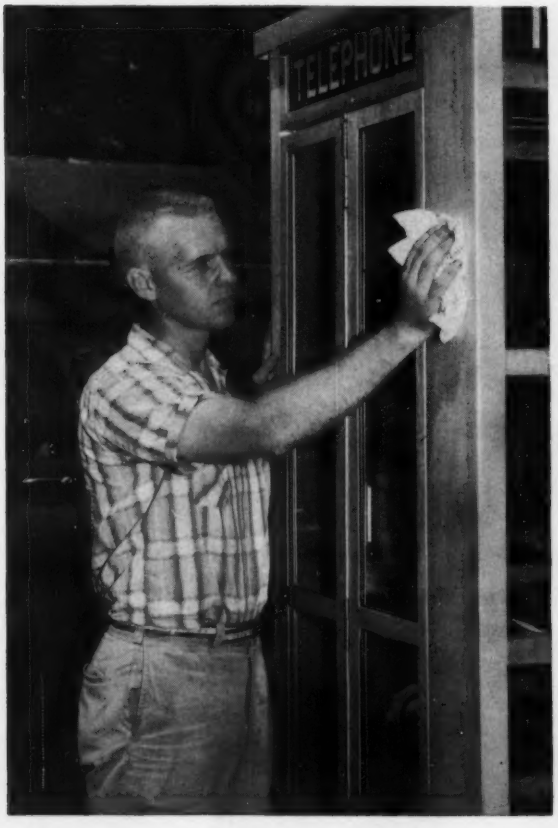
SHERRON METALLIC CORP., 1201 FLUSHING AVE., BROOKLYN 37, N.Y.

Added revenue from constant traffic at the roomy Alcoa booth in Oquawka, Illinois, pleases E. R. Watson, general commercial manager, Western Illinois Telephone Company.

"THIS ALCOA BOOTH PAID ITS WAY FROM THE START,"

reports E. R. Watson, Western Illinois Telephone Company

"Two years ago, we set up this Alcoa Aluminum outdoor booth in Oquawka, Illinois—a small fishing and resort town on the Mississippi—and it began paying for itself right from the day it was installed," declared E. R. Watson, general commercial manager for the Western Illinois Telephone Company.



"Maintenance is never a problem with Alcoa booths. A wipe with a damp cloth restores the aluminum to its original sheen, and the high-strength, solid Alcoa construction helps curb vandalism," says Mr. Watson.

"In peak vacation seasons, revenue from this one booth runs as high as $140 a month. People certainly seem to appreciate the convenience of outdoor booths and are attracted to the well-lighted and clean-looking Alcoa models. Like all 19 Alcoa booths on our system, installation was easy and maintenance is no problem. Routine sweeping and occasional washing are all that is ever necessary."

Telephone companies everywhere are discovering that Alcoa outdoor booths offer a sure way to gain additional revenue and customer goodwill. Their pleasing appearance, superior fluorescent lighting and larger interiors make them inviting to use. And the corrosion-resistant properties of high-strength, heat-treated aluminum give an unusually solid construction that assures profitable, long life investment.

FREE ALCOA GOODWILL KITS. Here's the big EXTRA that comes with every Alcoa booth. These free kits contain newspaper mats, publicity releases, envelope stuffers, radio and TV commercials—everything you need to tell your customers about the added convenience of booths of Alcoa® Aluminum.

FOR MORE INFORMATION ON ALCOA BOOTHS, write for brochure. And ask your jobber how Alcoa booths can increase your revenue and build customer goodwill. Aluminum Company of America, 1720-H Alcoa Building, Pittsburgh 19, Pa.

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and the Emmy Award winning "Alcoa Theatre" alternate Mondays, NBC-TV

ALCOA ALUMINUM

YOUR GUIDE TO THE BEST IN ALUMINUM VALUE

DRIVE-INS

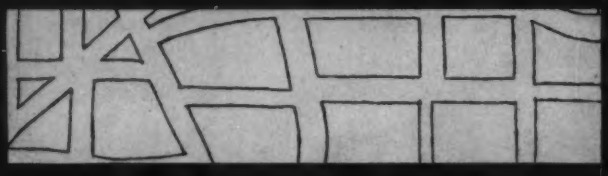
PARKING LOTS*

SHOPPING CENTERS

what are the best spots for

PUBLIC INSTITUTIONS

BUSY INTERSECTIONS



After you've found the best locations in your town, find out about installing AE paystations. They come in 10 sparkling colors. Reinforced, burglar-resistant housing discourages pilferage. Life-like transmission. Durable, moisture-proof coiled cord.

TRAVEL DEPOTS

RECREATION CENTERS

paystations in your area?

GAS STATIONS

use our handy **SURVEY SIMPLIFIER**
to pick the best locations!

Are you making full use of paystations as revenue builders in your town? It's easy to find out. Write for a free copy of our handy Survey Simplifier. It helps you find the best spots for paystations in your community. Address Automatic Electric Sales Corporation, Northlake, Illinois. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

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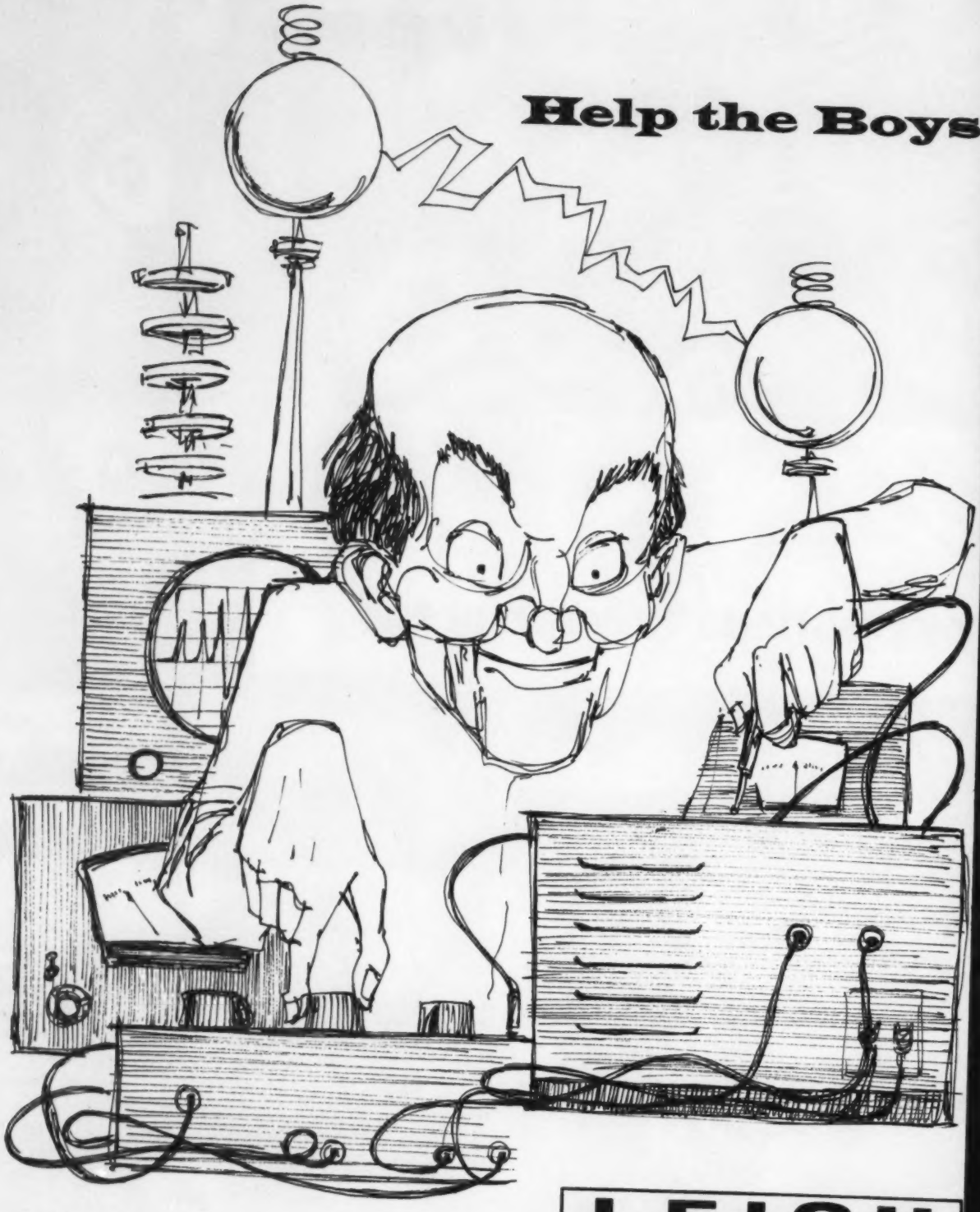


LEICH

Subsidiary of GENERAL TELEPHONE & ELECTRONICS

in the Back Room

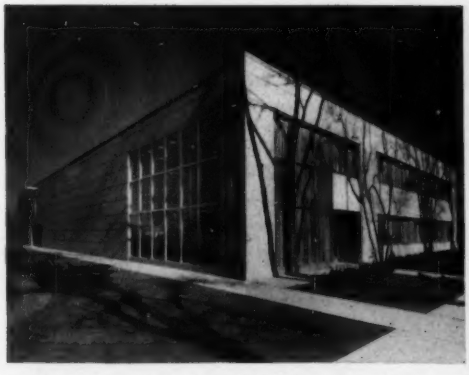
Help You

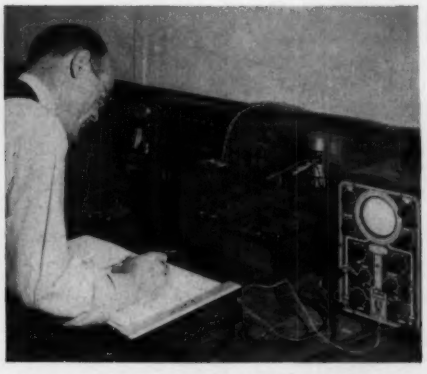
Let's face it. If you want to stay ahead in business, you have to have some creative genius orbiting in the back room.

Seriously, Leich has always spent considerable time and money on research to bring the telephone industry advanced equipment, better ways to get the job done.

You help us carry on valuable research and development work when you purchase supplies from Leich. Besides, we give you the finest supply service available. You get fast delivery along with the highest quality tools, supplies and materials.

Why not order your supplies where the whole company is working for the long haul and not the quick dollar? Try us for your next supply order. You'll like Leich.





The research facilities at Leich are complete . . . Leich research people know telephone technology.

LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

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manufacturers of telephones, switchboards and related apparatus since 1907

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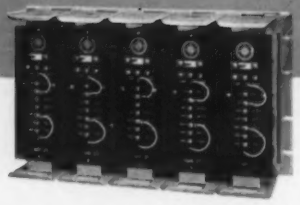
TRANSISTOR MULTI-RINGERS



Warren 25 watt TMR (shown with cover removed): 10½" high, 19" wide, 12" deep; 90 pounds net weight. Write today for complete information.

Warren TMRs are battery-powered, five-frequency, transistor ringing generators. They provide stable, continuous, on-frequency ringing in the harmonic, synchromonic and decimonic series. Available from stock in 25 and 50 watt sizes, these compact, all-transistor TMRs have been field-proved in many installations throughout the country. Specify Warren TMRs and get what you want *most* in ringing generators... efficiency, dependability, stability.

WARREN MANUFACTURING WM

THE WARREN MFG. COMPANY, INC.
LITTLETON, MASSACHUSETTS

A Plea for More Telephone Engineering Courses

THE USITA, as well as other, telephone management and engineering courses recently concluded represent tremendous strides in the direction of adequate educational opportunities for management personnel in executive positions.

An even broader gauge management outlook and ability is reportedly afforded by courses in the humanities which have been developed for telephone personnel—such as the one Bell Telephone Co. of Pennsylvania helped develop, a course which includes history, philosophy, literature, art, music and the social sciences (TELEPHONY, Aug. 6, 1955).

However, we should not let this wealth of educational opportunity cause us to lose sight of the need for the industry to encourage universities, colleges, and vocational or trade schools to establish straight technical and plant courses for present telephone company employes (and prospective telephone employes now in high school) who desire to get advanced education in basic telephony.

One telephone technology course has been established and enters its second year in September (see page 44, this issue, for report of first year and list of courses). That course, given at Southern Technical Institute, Chamblee, Ga., was established to a great extent through the encouragement of REA officials, Independent telephone companies in the southeastern United States, and TELEPHONY.

It will be recalled that TELEPHONY's editor appealed for such telephone training opportunities in convention addresses he gave in the spring of 1953. This talk, titled "Some Basic Needs of the Independent Industry," later was reprinted in full (TELEPHONY, May 26, 1956).

We now feel that the industry should give thought to making more straight telephone engineering courses available—for, as we said, present telephone company employes and prospective employes now in high school. Telephone technology is advancing at such a swift rate that such engineering courses are fast becoming indispensable preparation for installing and maintaining the most modern equipment.

Another advantage: If an Independent company advertised in, or announced to, appropriate newspapers the fact that it was prepared to recommend a telephone technology school to local high school graduates, this could also enhance the Independent's public relations.

Considered from all angles—the good of the people to be trained, the telephone industry at-large, and of subscribers—more straight technical and plant courses in telephony are to be desired. It remains for those in the industry who recognize this need to work with and encourage universities, colleges and trade schools to establish such courses in various sections of the country.

The P.U.R. Guide

A Practical Employe Educational Program

Since Apr. 1, 1957, over 5,000 employes of gas, electric, and telephone companies have taken and profited by a unique year-long educational program, broadly covering economics, regulation, subscriber, employe, and public relations and other special non-technical aspects of public utility operations. Tested and graded, most of these "graduates" are today the best spokesmen for this inexpensive service available to all utility companies.

EMPLOYE training is one of the real headaches of utility management today, in the telephone business as well as in other public utility fields. Long recognized as the keystone to efficient and profitable operation, as well as good public relations, the generally well-informed employe can only arrive at that state through careful and skillful teaching which is beyond the normal scope and function of day-to-day management.

With the burden of mounting managerial responsibilities, increasing in number and complexity, this "school teaching" chore is obviously becoming an "outside job" because of the very importance of seeing that the job is done right.

The reference here, of course, is to those necessary informational programs which are needed *in addition* to the regular on-the-job training of employes at all levels.

The latter type of programs, management must conduct under its own direct supervision and control. Indeed, it is because of the increasing burden of the many varieties of on-the-job training courses necessary, that utility company managements may welcome the opportunity of turning over the responsibility for general information and education programs to experienced outside specialists.

The difficulty in the past has usually been the lack of available programs suited to various employe levels.

Obviously, the junior executive requires more intensive training in the complexities of the utility field as a whole than the supervisory employe. And, in recent years, a number of management training programs have been established, either conducted on a university campus or at some other selected site where "students" through continuous residence in association with each other can go through a period of intensive training.

Such a course is the USITA Management Development Program given the past two summers at the University of Kansas.

The Bell system, gas and electric utility groups, and the National Association of Railroad & Utilities Commissioners have established similarly patterned programs—some going back for a number of years.

But it is at the supervisory level—where the competent and ambitious employe has emerged from the rank and file—that the educational gap has been hardest for management to fill. This is because of the larger number of persons involved, plus the more exacting requirements of such a program. Obviously all these employes cannot be sent off for weeks, to some faraway place at company expense.

Yet, these are the very ones, the district managers, the newly recruited special-service employes, and the other supervisors, who are most in need of clear and complete answers to such elementary questions as: "What is a public utility? What is a reasonable rate, and how is it determined? How does regulation of utilities work?"

Fortunately, an exceptionally well-rounded educational program aimed directly at this important, but often neglected, supervisory level is now available.

It is The *P.U.R. Guide*, published by Public Utilities Reports, Inc., of Washington, D.C. This company has been in the business of publishing decisions and other materials on utility regulation and allied subjects since 1915. The firm also publishes *Public Utilities Fortnightly*, whose editor, Francis X. Welch, was chiefly responsible for the editorial organization and preparation of the *P. U. R. Guide* material.

The mechanics of the *Guide* are simple and flexible.

The utility company employe can be enrolled at stated times during the year in "classes." He then receives — over a period of one year—a weekly lesson on a different subject.

These lessons can be used either on a home-study basis, during which the

employe can grade himself on every lesson, or on a group study basis supervised by a company director.

Where the conference method is used, a supplemental service, in the form of a "Leader's Manual," is furnished to discussion leaders at no extra cost.

Company management can actually evaluate the progress of their employe through two semi-annual term examinations.

The enrollee's answers to these "midterm" and "final" exams are independently graded, and the company is also notified of the results. Those interested may write to Public Utility Reports Inc., 332 Pennsylvania Bldg., Washington, D. C. The enrollee is awarded a certificate of merit on the basis of the passing grade. This control feature remedies one nagging problem of management sometimes encountered in some seminar setups for higher level personnel. That is the problem of deciding whether the "students" are really getting as much out of such programs as they should, and at what price. (Incidentally The *P. U. R. Guide* costs $50 per enrollment — including individually stamped ring binder, 50 weekly issues, glossary, index and other supplemental material.)

What about the coverage? Well, the best way to explain it is to compare it to a bus ride through the various fields of information in which the employe is to be instructed.

Picture a group of earnest employes climbing into this *P. U. R. Guide* "bus" to embark on this "journey of understanding." Where would the logical start be? Obviously, at the start of the utility business. How *did* utility businesses get started in the United States? That is the subject covered in Guide 1.

Next, how does the utility business fit into the American economy in general? That is Guide 2.

What is a public utility? What are its characteristics as distinguished from other lines of business? That is Guide 3. These three topics relate to the area of "free enterprise."

But, with Guide 4, the P. U. R. bus passes into a new area—that of overall regulation. Without taking the time or space here to break down the coverage of the individual Guides going through this area, nine Guides (from No. 4 through No. 12) deal, respectively, with such regulatory topics as state commissions, federal commissions, fair return on a fair value concept, and valuation. They also cover expenses, accounting, depreciation, and fair return.

Then, the journey of understanding enters into the related, but broad field, of rate making (Guide Nos. 13-17). These five Guides cover such related topics as rate structures, filed tariffs, differential charging, rate forms and comparisons, and the conduct of a rate case.

The "journey" then leaves the field of rates and travels through the field of service (Guides 18-21). It then turns into the financial district (Guides 22 through 26) where the mysteries of security issues are cleared up. At this point, which is a little more than halfway, the mid-program questionnaire test occurs.

The second part of the "journey of understanding" then heads into the field of management problems (Guides 27 through 29), through customer relations (Guides 30, 31), labor relations (Guides 32 through 34), and public relations (Guide 35).

The problems of public ownership and the utility cooperative are dealt with in six Guides (36 to 41, inclusive).

Special problems of natural gas and telephone utilities are also covered (42 and 43, respectively). The concluding part of the "journey" (44 through 50) deals with such other subjects as taxes, holding companies, community relations, current developments, and a final review.

The most noteworthy attribute of the *P. U. R. Guide* is its clarity. Short, simple sentences, making use of imaginative illustrations, bring complex problems such as accounting, finance, and rate structure, within the easy grasp of any intelligent student with the equivalent of a high school education.

Yet the very scope of the coverage (indicated above) makes it apparent that the enrollee who pursues this course to completion, with a satisfactory passing grade, has received the equivalent of at least a semester of college training in a highly specialized subject.

This can be done, of course, only through the elimination of time-consuming references, case citations, collateral reading, and technical discussion. Admittedly, this is a meaty subject, but in the Guide it has been skillfully prepared and palatably seasoned and served. As an example, here is a random passage (from Guide No. 12) explaining the nature of a utility rate schedule as filed with the commission:

"A utility rate schedule (often called a rate 'tariff,' which will be explained later) might be very roughly compared with a price list in a store or a menu in a restaurant. It notifies the customer what the charge to him will be if he selects this, that, or the other product —or utility service. If there is any price advantage for quantity purchases or on limitation of service to any class of customers, or any discount or penalty as to time of payment, that information must all be supplied in advance to the customer.

"In this respect, it may well seem to you that rate fixing by the filing of schedules is a sort of backward process for arriving at final reasonable rate fixing. All that we have discussed up to now is how much money *all* the customers will have to supply for their total service to cover the utility company's revenue requirements. Now we come to the design or details of rate schedules which will produce that amount, as nearly as can be expected, based on experience and expert judgment. However, that is the way rate regulation works as a practical matter — going from the general principle to the practical application in the case of the particular customer.

"You can readily see that if rate fixing were to move in the other direction —by fixing exact rates first—it would involve a trial-and-error or hit-or-miss procedure. There could be no telling in advance whether the actual rates fixed would produce too much or too little revenue. Rate schedules, therefore, simply represent the rates *chargeable* to each customer, according to his class and usage. Revenue requirements, on the other hand, should be equal to the amount expected to be *produced* by these chargeable rates."

A program of this kind, however, must be carefully tailored to the requirements of the subject and the general capacity of the student. It is like a doctor's prescription which should only be administered under properly controlled conditions, subject to periodic checks. It is for this reason that the *P. U. R. Guide* is available only through sponsorship by a public utility company. Individual subscriptions are not taken, except under special circumstances, such as for commission staff personnel, where company sponsorship would not be available.

The periodically revised loose-leaf binder enables the publishers to make revisions, to keep charts, tables, and statistical data fresh and up-to-date.

Then, too, the "weekly dose" is based on sound pedagogic psychology—since no one, however well intentioned or determined, can read a whole book

(Please turn to page 48)

Welch at ABA Meeting

"In the Nation's Capital," by Francis X. Welch, does not appear in this issue because Mr. Welch is attending an American Bar Association meeting in Miami Beach, Fla.

Mr. Welch's column will resume in the first issue in September.

A B C of the Telephone

by Frank E. Lee

TYING a line wire properly used to be the badge of a top lineman. This was a pretty good gauge of a lineman's skill, because in the early years of telephone history, making a good open wire tie required definite skills that were not mastered in a few minutes. The tie wire had to be placed exactly right. A prescribed number of wraps were placed around the insulator. A certain number of turns of each leg of the tie were placed around the line wire.

Today, one of the marks of a good lineman is being able to erect a high-quality open wire line in the shortest possible time. Several new ready-formed tie wires are available to help do this kind of a job.

Some of the new tie wires are tailor-made to fit the combination of the particular wire and the specific insulators used on the line. These tie wires are cut to length and pre-shaped. All the lineman has to do is place the tie around the insulator and wrap the legs of the tie around the wire. The tie grips the wire and holds it firmly to the insulator.

A number of engineers consider that holding the wire *to* the insulator has advantages compared with holding the wire *against* the insulator. In the past, wear caused by vibration at insulators has caused trouble on many open wire lines. Some of the newer ties have a reinforcing section as a separate unit from the binding to the insulator. This anchors the wires in place; provides needed reinforcement at the insulator, and prevents line wire abrasion at the insulator.

Another of the new pre-shaped ties is designed as a one-piece unit. The ends of this tie interlock at the insulator to form a cradle to hold the wire to, but not against, the insulator. This tie also anchors the wire in place, eliminates the need for reinforcing the wire of the insulator and prevents line wire abrasion at the insulator.

One of the new tie wires provides a considerable degree of horizontal holding power along the line in addition to anchoring the wire to the insulator. This holding power is developed by the grip exerted against the wire by the helical-shaped ends of the tie.

Part 90. OUTSIDE PLANT CONSTRUCTION—Section 16. Open wire lines in the telephone plant—continued.

Section 1. Planning of additions to outside plant (TELEPHONY, Nov. 17, 1956).

Section 2. Laying out the pole line, clearances to be maintained, and grading requirements (TELEPHONY, Nov. 24, 1956).

Section 3. Selection, treatment, handling, storage, and gaining of poles (TELEPHONY, Dec. 1, 1956).

Section 4. Items of power equipment used in pole line construction and maintenance. Also discussed are depth poles set in various types of soil (TELEPHONY, Dec. 8, 1956).

Section 5. Purpose of guy wires and factors involved in their proper placement (TELEPHONY, Feb. 16, 1957).

Section 6. Types of guy wires, how to determine guy loads, and the selection of guy strand (TELEPHONY, Feb. 23, 1957).

Section 7. Selection and installation of anchors (TELEPHONY, Apr. 27, 1957).

Section 8. Selection and installation of anchors—continued (TELEPHONY, May 4, 1957).

Section 9. Installation of new cable facilities—lead and plastic (TELEPHONY, Sept. 14, 1957).

Section 10. Installation of new cable facilities—lead and plastic (TELEPHONY, Mar. 8, 1958).

Section 11. Methods used to fasten aerial cable to messenger strand (TELEPHONY, Aug. 9, 1958).

Section 12. Methods used to fasten aerial cable to messenger strand —continued (TELEPHONY, Aug. 16, 1958).

Section 13. Application of lashing rods, lashed cable supports, and typical aerial cable arrangements (TELEPHONY, Apr. 25, 1959).

Section 14. Self-supporting cable and wiring at aerial cable terminals (TELEPHONY, May 2, 1959).

Section 15. Open wire lines in the telephone plant (TELEPHONY, Aug. 22, 1959.)

In addition, a special friction coating is applied to the inner surfaces of the legs of the tie. Test results indicate that a tie of this type is capable of supporting a 500-pound unbalanced pull.

The ability of a tie to support an unbalanced load may be of little consequence, under normal conditions, after a line is completed. However, during construction this feature would be of advantage as successive sections of the line are pulled to tension and tied in place.

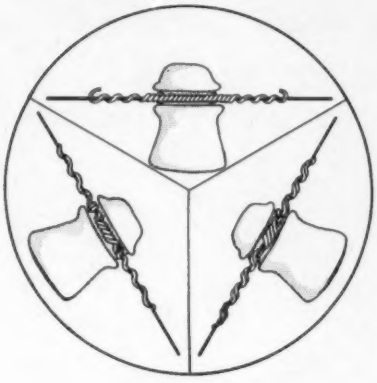


Fig. 1

Also, much less drooping of wires would occur in spans adjacent to a break in the line if the ties were capable of sustaining a fairly high horizontal pull. This advantage was mentioned previously while discussing the over-all advantage of the new ways or methods of building open wire lines. Three of the new tie wires are shown in *Fig. 1*.

Splicing Open Wire Easier

Splicing of open wire has also been improved. Originally open line wire was spliced by wrapping together the ends of the separate lengths of wire. Various configurations were used in attempts to make the splices strong mechanically and good electrically. Essentially, however, the splices were quite similar in the end results. The electrical bond depended upon the tightness of the wrap at the splice. The mechanical strength was also controlled by the way the wires were wrapped together or how much care was used in making the splice.

Without a doubt there were many, many good splices made using these original methods. The growth of the telephone industry is definite proof that a tremendous amount of skill was applied in building the open wire lines needed to provide a broad communication network. The successful operation of these lines required careful attention to every construction detail—including splices of open wire line.

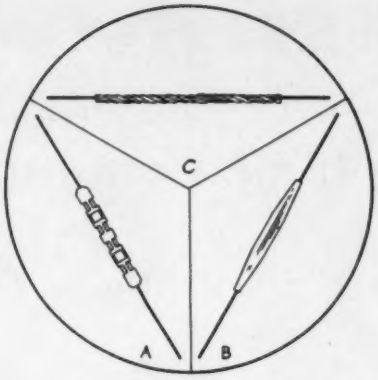


Fig. 2

The amount of time required to make a wrapped splice was one factor leading to the development of new splicing techniques. Another important factor was that wrapped splices occasionally developed a high resistance connection which reduced transmission efficiency.

One of the new methods, widely used in the industry today, is the pressed sleeve splice illustrated in *Fig. 2A*. In making this splice the wire is placed in a hollow sleeve and each end of the sleeve is pressed against the wire in two or three places with a sleeve pressing or compressing tool. The wire will break before a properly made pressed sleeve splice will fail.

Link-type splices, see *Fig. 2B*, are also widely used on open wire lines. These links have a tubular outer shell with a set of gripping jaws in each end. The ends of the wires to be spliced are slid into the link. The jaws automatically grip the wires and the splice is completed. The wire will break before the splicing link will fail or before the wire will slip, once it is inserted in the link.

The spiral wrap splice, shown in *Fig. 2C*, is another popular splice used on open wire lines. Splices of this type are made of a number of hardened steel wires formed into a helix. The preshaped strands of the splice are wrapped around the ends of the line wire. The grip of the splice increases as the line wire is placed under tension. The wire will break before a spiral wrap splice will loosen.

The new splices can be installed in much less time than was required to make the older type splice. The new splices also maintain good electrical contact between the spliced wires. This means savings in construction costs and a substantial reduction in maintenance expense.

Dampers Practically Eliminate Wind Damage

Open wire moves or swings in a span as the wind blows from different angles. The extent of the movement is governed by a combination of factors, including the length of the span, size of the wire, tension of the span, and the force of the wind.

In some cases the wire may move at a more or less steady frequency or rate of oscillations travelling back and forth over the length of the span. Also, there are various harmonics of the shorter oscillations plus a tendency for the entire span to swing. The movement of the span itself usually is only barely perceptible in shorter spans with less sag.

Vibration itself has no effect on the transmission characteristics of an open

(Please turn to page 60)

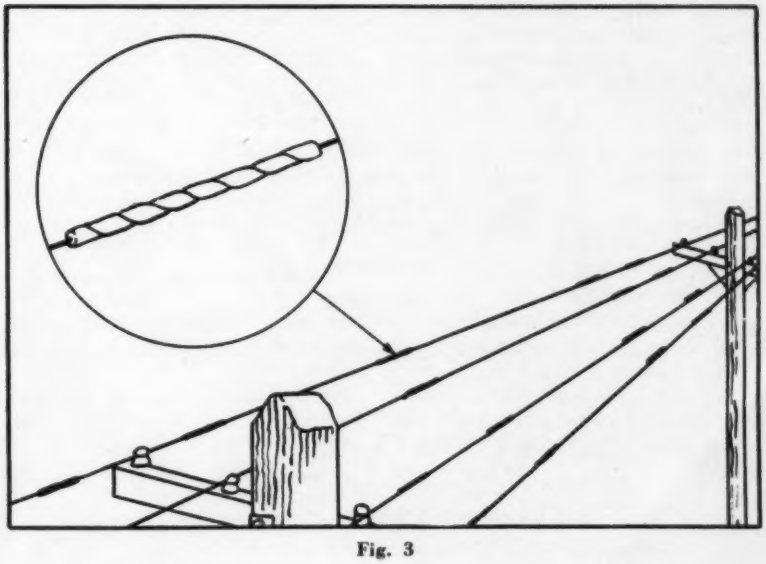


Fig. 3

Impact of Telephone Communication

On the Economies of the Various Geographic Regions of the U. S.

By ALEXANDER I. WARRINGTON

PART VII. Region 7. Rocky Mountain—Montana, Idaho, Wyoming, Colorado and Utah.

Rocky Mountain

THE PER CAPITA income in 1956 was below the national average or 1,774 dollars and in 1939 it was 500 dollars; the increase was 254.8 per cent. Expressed in millions, the population in 1956 was 3.8 and 3.0 in 1939, an upswing of 28.9 per cent; there were 1.1 households in 1956 and 0.8 in 1939, an increase of 40.9 per cent.

In millions there were 1.4 telephones in 1956 with 30.0 per cent for business and 0.4 in 1939 with 35.9 per cent for business. The increase was 198.9 per cent.

Between 1939 and 1956 there was an increase in employment of 210.0 per cent. In thousands there were 2.9 manufacturing establishments in 1939, and 2.4 in 1900; employment in 1956 was 162.0; in 1939, 75.7; and in 1900, 41.3.

In millions of dollars, payrolls in 1956 were 719.0; in 1939, 101.2; and in 1900, 27.1. Value added by manufacturing in 1956 was 1,582.0; in 1939, 217.4; and in 1900, 60.7.

In 1958, in thousands, there were 1,491.0 telephones with 441.7 for business and 1,049.3 for home use.

The personal income in 1957 was 7,731 million dollars.

The employment for 1958 is shown on the basis of states with the heaviest concentration of employment by type of industry:

Type of Industry	*State*
Mining	Wyoming
Contract construction	Wyoming
Manufacturing	Idaho
Transportation and other public utilities	Wyoming
Trade	Colorado
Finance, insurance and real estate	Colorado
Service & Misc.	Idaho
Government	Utah

Montana

The per capita income in 1956 was 1,862 dollars and in 1939, 530 dollars, an increase of 251.3 per cent. These averages were above those of the region. In millions the population was 0.6 in 1956 and 0.5 in 1939, an increase of 13.2 per cent; there were 0.1 households in 1956, an increase of 17.9 per cent since 1939.

There were 0.2 million telephones in 1956, an increase of 196.6 per cent since 1939. In 1956, 28.1 per cent of all telephones were for business use and in 1939 it was 36.6 per cent.

In thousands, there were 0.5 manufacturing establishments in 1939 and 0.3 in 1900; employment in 1956 was 21.0; in 1939, 11.9; in 1900, 10.3.

In millions of dollars payrolls were 95.0 in 1956; 17.2 in 1939; and 8.1 in 1900. Value added by manufacturing was 243.0 in 1956; 38.8 in 1939; and 22.6 in 1900.

Telephones, in thousands for 1958, were 220.7 with 61.0 for business and 159.7 for home use.

Personal income in 1957 was 1,263 million dollars.

Employment was distributed as follows in 1958:

Type of Industry	*Percentage Distribution*
Total Employment	100.0
Mining	6.9
Contract construction	7.4
Manufacturing	12.5
Transportation and other public utilities	12.9
Trade	25.1
Finance, insurance and real estate	3.6
Service & misc.	13.4
Government	18.2

Idaho

The per capita income in 1956 was 1,587 dollars and 434 dollars in 1939, an increase of 265.6 per cent. In millions, population was 0.6 in 1956 and 0.5 in 1939, an upturn of 16.0 per cent; there were in 1956 0.1 households, an increase of 26.5 per cent.

Also in millions, there were 0.1 telephones in 1956 with 27.4 per cent for business; in 1939 the percentage of telephones absorbed by business was 33.5 per cent. The percentage increase was 179.7.

In thousands there were 0.4 manufacturing establishments in 1939 and 0.2 in 1900; employment was 27.0 in 1956; 11.7 in 1939; and 1.6 in 1900.

In millions of dollars payrolls were 115.0 in 1956; 14.6 in 1939; and 0.8 in 1900; value added by manufacturing was 205.0 in 1956; 29.7 in 1939; and 1.5 in 1900.

In 1958, in thousands, there were 198.5 telephones with 53.9 for business and 144.6 for home use.

Personal income in 1957 was 1,043 million dollars.

The employment distribution in 1958 was as follows:

(Please turn to page 46)

AE-Lenkurt

HAS **EVERYTHING** YOU NEED FOR PROFITABLE CIRCUIT GROWTH

LENKURT SUPERVISION & CONTROL EQUIPMENT, for instance...

With Lenkurt Supervision & Control Equipment, you can open the door to highly profitable leased-line and extra toll business—*now*.

More and more business and industrial concerns are looking to telemetering and remote control to cut costs and increase efficiency. Lenkurt offers several types of equipment to do this job. For example, there's Type 51B.

Type 51B is designed to operate over the wire or radio facilities which it supervises. When linked to any wire line or carrier channel, up to 80 remote indications can be supervised, and 90 remote operations can be controlled from a single control center.

For full details ask for Circular 51B-P4.

Whatever *your* expansion plans may include, AE-Lenkurt has what you need—plus the talent to handle the entire project from start to finish.

AE-Lenkurt services are flexible, and backed by experienced *telephone* engineers who are fully acquainted with the capabilities of your present equipment. They'll evaluate your requirements, then recommend the type of equipment that will meet circuit conditions most efficiently and economically over the years. Or, if you wish, they'll provide you with *complete* planning, engineering and installation service that relieves you of all short-range and long-range circuit expansion details.

For more facts on progressive planning for growth, call your Automatic Electric representative, or write T. B. Collins, Director, Carrier & Radio Sales, Automatic Electric Sales Corporation, Northlake, Illinois.

ALL YOUR COMMUNICATIONS NEEDS FROM ONE DEPENDABLE SOURCE

AUTOMATIC ELECTRIC GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

these three spectres are haunting your future!

Are you already face to face with the problems facing telephone operating companies?

Steady population growth means ever-increasing numbers of telephones—and this station increase is being accelerated by population shifts to areas served by Independents.

Increases in telephone usage, as the phone becomes more and more indispensable to our business and social life, imposes heavier and heavier traffic loads on switching equipment.

Additionally, there is the spectre of technical progress which is rapidly making each operating company, even the smallest, part of a nationwide telephone network in which every phone in the U.S. will have direct access to each of the 60 odd million other phones.

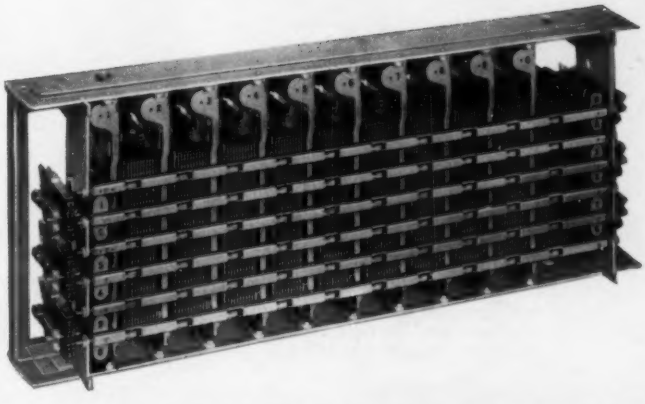
Switching equipment, to adequately meet the critical demands the future will impose upon it, must meet these specifications:

1. It must be readily and economically expandable to keep pace with station increases.
2. It must occupy minimum space to reduce building costs.
3. It must be flexible to enable operating companies to provide single party service as line fill drops.
4. It must be compatible with other systems.
5. It must have operating characteristics that maximize speed and traffic handling capacities.
6. It must be fully adaptable to network operation, DDD and automatic toll ticketing.
7. It must be inherently maintenance free and economical to operate.

North By-Path Crossbar is the only Switching Equipment on the Market That Meets All These Specifications!

As you look to the future, as you face the problems the future will impose, it becomes increasingly obvious that North By-Path Crossbar, the "proved in use" crossbar system, is THE answer to your future switching requirements.

Let your North Sales Engineer help you plan for the future NOW—with



North BY-PATH CROSSBAR

another telephone engineering achievement from

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

SECODE
SELECTIVE CONTROL DEVICES
Reports On...

Dial Signaling for Telephone Maintenance Radio Service

Secode selective signaling is the outgrowth of our work with telephone companies since 1927. It is really a page out of the phone company's own book. It puts the company's private mobile radio system on a dial calling basis and does away with old-fashioned "party line" operation.

You Always Get Your Man

With Secode selective dialing, your dispatcher dials mobile units *individually* without alerting others. If your man is away, a panel light tells him he was called. If he's up a pole or in a building, your dispatcher can blow his truck horn or turn on the headlights.

A Flexible System

You can call one service truck, a group, or all units together. You can choose between one and two-way dialing from office to vehicle, vehicle to office, and vehicle to vehicle. And you'll be surprised by the low cost in each case. Users say they don't know how they got along without Secode.

Unequaled Reliability

The rugged Secode selector is an electro-mechanical switch, responsive to digital pulses. Its contacts close only upon receipt of appropriate pulses and reject all others. Secode equipment is OCDM approved and eligible for matching funds.

More Distance

Secode signals get through noise and interference miles farther than voice calls. Secode dial signaling gets through despite hills and obstructions.

Tie-In with Land-Line

Secode also offers complete terminal equipment to interconnect private systems with land-line systems so any extension can dial any mobile and vice versa. These systems are fully compatible with present Bell and independent equipment, and are simple and economical to install.

New Brochure

For more details, write now for our new 8-page brochure or call your nearest Secode engineering representative for a free copy.

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USITA Announces Convention Speakers

THREE MEN of national prominence from outside the telephone industry will address the 62nd Annual Convention of the United States Independent Telephone Association at Chicago, Oct. 11-12-13-14. The three well-known figures, each of whom has left his imprint upon the American scene, and whose forensic abilities, recruited by the Association, will inform and delight the men and women of Independent telephony, are:

George Murphy, stage and screen star, public relations man of the motion picture industry and vice president of Desilu Productions, Hollywood, Cal.

Roscoe Drummond, syndicated columnist and Washington bureau chief of the *New York Herald Tribune.*

Arthur "Red" Motley, publisher of *Parade,* the Sunday newspaper magazine, and master salesman.

In addition to starring in many stage and screen productions, George Murphy has been active in many ways on the national scene. In 1953, he was the entertainment director for the Presidential inauguration in Washington. He is a member of the Screen Actors Guild and past president of the Academy of Motion Picture Arts & Sciences. In 1950 he received an Academy Award. During recent years he has devoted a large portion of his time to public speaking and public relations activities.

ROSCOE DRUMMOND

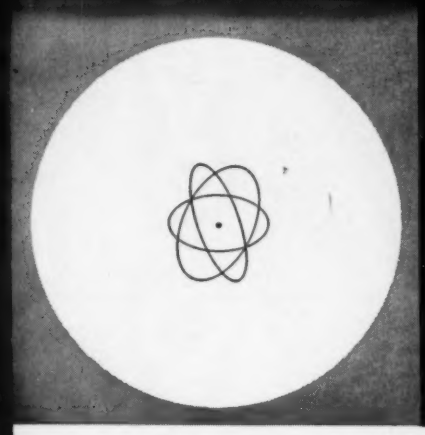
GEORGE MURPHY

Considered one of the country's leading news interpreters, Roscoe Drummond is noted for the independence and objectivity of his reporting. Widely respected among his fellow-newsmen, he reaches a large segment of the American public through his four-times-weekly column "Washington," which appears in more than 100 newspapers from coast to coast.

Mr. Drummond, who has been called "Mr. Washington Correspondent," began his career in journalism as a staff reporter with the *Christian Science Monitor* in 1924. During one of his as-

(Please turn to page 45)

ARTHUR MOTLEY



TELEPHONY'S ELECTRONICS SECTION

BY HAROLD B. McKAY, ELECTRONICS EDITOR

FIELD WIRE

ARMY field communications have advanced a long way from the field wire used in the last war. Now a polyethylene-insulated coaxial line has been developed which will carry 96 conversations at once. But the new cable is not the only miraculous part of the system. Even better is the method by which it is put in place.

A new cable package, which stores the cable in a zig-zag fashion, can be picked up by a helicopter and whisked away at 100 miles per hour. The cable can be payed out over any kind of terrain, and it is installed as soon as the aircraft reaches its destination.

PARAMETRIC AMPLIFIER

A TEST of the low-noise parametric amplifier on the northernmost and longest over-the-horizon microwave link of the White Alice system has revealed that the present 12 channels can be improved in quality and 60 new channels added, William Sichak, director of ITT's Radio Communication Laboratory, has announced.

Under the supervision of Jack Harvey, development engineer, and Engineer Copthorne Macdonald, two amplifiers were installed at Kotzebue, Alaska, 200 miles north of Nome, to receive the signal transmitted from Cape Lisbourne, 180 miles to the north. The measurements showed a six-to-eight decibel reduction in channel noise and a reduction in teletype error by 90 per cent. A pair of receivers connected in dual diversity with the parametric amplifiers, carried all operational circuits for 24 days during March and the first part of April.

Although March is one of the worst months of the year for tropospheric scatter propagation, no outages were reported. Also, the amplifiers, operated during this period without failure. The results showed that, by using the ITTL-developed amplifiers, the reliability of this link could be increased materially and channel noise reduced to the very low noise required for long distance telephone transmissions.

An even more important development was foreseen as a result of these tests. By using parametric amplifiers on all links, it would be feasible to maintain circuits with batteries during prime power failure, thus virtually eliminating outage time.

THE "SCANDEX"

ONE feature common to most computing machines is the fact that some mere human is needed to feed the problems to it.

In some cases, this means the punching of cards to represent certain information.

Now there is a thing called "Scandex" which can read the information and then automatically punch the cards. AT&T is using the new gadget on their dividend checks. The machine scans the check, punches the amount and the stockholder's certificate number on the check, so that it can be sorted automatically after it has been cashed. Ohio Bell is also using the machines in their billing operations.

ITT TO BUILD POSTOFFICE

ITT HAS received a contract to build and equip the nation's first fully-mechanized mail processing plant and post office at Providence, R. I.

Intelex Systems, Inc., an ITT subsidiary, will erect this "post office of tomorrow" at an estimated cost of 20 million dollars and lease it to the Post Office Department for 20 years at an annual rental of approximately 1.4 million dollars.

The entire project is scheduled for completion in 1960, according to Edmond H. Leavey, president of ITT.

ITT was selected for this initial project because it has pioneered in the development of much new postal equipment all over the world. The system furnished the new automatic letter sorter at the Washington, D. C., post office which sorts 18,000 letters an hour to 300 different destinations.

This marks for the first time in the U. S. the complete mechanization of a single "working post office" in a metropolitan area. It will serve as a laboratory for highly advanced experimentation in mail handling methods and systems.

Mail in the new facility will move swiftly by machine, almost never coming to a stop.

Newer machinery to be installed will include devices to "cull" letters from larger pieces of mail and to "face" letters in proper position to be canceled at high speed. The canceled letters will then be moved automatically to human operators seated at key boards which operate other machines that will sort many

thousands of letters hourly to hundreds of destinations.

At the same time, similar automatic machinery also will speed the sorting of parcel post and other bulk types of mail.

ELECTRONIC AGE

THE electronic age is resulting in automation reaching ever deeper into our lives. A New York mail order house advertises a gadget for fishermen which will tell an angler when he has a bite. The unit uses a battery and meter and is called the "electro-strike-ometer."

Also available is a pair of sunglasses equipped with a radio receiver in the temple pieces. If you get tired watching a baseball game, you can close your eyes and merely listen to it as it is broadcast.

These wonders often bring their share of troubles. For instance, there is now available a remote-control for television sets which operates by supersonic vibrations. That is, when you hold this gadget in your hand, you can turn the TV on and off, change stations or volume by merely manipulating the gadget. Control is by high-pitched waves—too high for the ear to hear. This feature might annoy a dog who can hear high frequencies, but this isn't the trouble which occurred.

Seems that the Hilton Inn at the San Francisco Airport installed TV sets in each room for its guests. It also had the latest types of telephones installed. Result, according to the *San Francisco News*, is that every time the telephone bell rings, the TV set turns on. Evidently the higher harmonics from the telephone bell strike just the right pitch to trigger off the TV set. Wonder how a repairman goes about fixing *that* trouble.

But electronics doesn't stop with phone bells and TV sets. The mighty resources of the Stanford Research Institute are concerned right now with making beans more digestible, and with finding new ways to wash vegetables. In the latter project the scientists have found that sonic waves can do a better job of cleaning things. The vibrations shake the dirt loose, and water washes it away.

Somebody will probably make an electronic bathtub next.

•

You are probably aware of the fact that some railroads have experimented with closed circuit television for reading numbers on cars at a distance. An incoming train is illuminated as it enters the yard, and a TV camera squints at the car numbers and displays them on a TV screen at a distant point. Somebody still had to write the numbers down with this system, even though he didn't have to stand next to the tracks to do so.

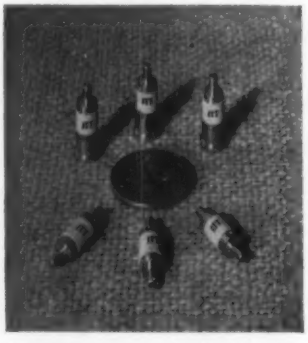
Now Stanford Research Institute has developed a new system for the A.B. Dick Co., which goes the old system one better. The new method still uses a TV camera to "look" at the train.

However, instead of merely reproducing the image on a TV screen, a permanent picture is made instead. The picture is made by electrostatic rather than chemical means.

The electrical image as received from the TV camera is recorded on a strip of paper as varying electrical changes. The paper is then dusted with a powder which sticks to the paper in accordance with the amount of electrical charge at different points.

As a result, the powder which adheres forms a photographic image which can be seen. A heat treatment "sets" the powder into a permanent image. Railroad men, instead of having to quickly write down a string of car numbers now get a 2-inch strip of paper which contains a photograph of the entire train as it passes the camera. Car numbers, and the position of cars in the train can be seen at any time by looking at the picture. A further development of the system contemplates the transmission of waybills and other forms by electrophotographic techniques.

The process is called "Videograph." You can get further information on this system from the A. B. Dick Co., 5700 West Touhy Ave., Chicago 48, Ill.



A new parametric diode with many applications where high cut-off frequency is required has been announced by the International Telephone & Telegraph Components Division, Clinton, N.J. Developmental types include diodes with cut-off frequencies ranging up to 150 kilomegacycles, with zero bias capacitance as low as 0.4 micro-microfarad.

FILTERS

THE DESIGN of filters is a specialized and complicated field. Yet the increasing number of applications for these devices renders a

more widespread knowledge of them desirable.

Now a bulletin has been printed, which is a welcome addition to the literature on this subject. This bulletin describes the basic types of filters and their respective transmission curves. Also included is an outline of the information needed to design each type.

You can get a copy of this bulletin and learn a lot about filters by writing to Reeves-Hoffman Division, Dynamics Corp. of America, Carlisle, Pa. Ask for Bulletin EWF/59-1.

WEATHER REPORTS

THE "old telephone party line" is the basis of a proposed "high volume, high speed weather information distribution system" which is 20 times more useful than the existing system, the summer and Pacific general meeting of the American Institute of Electrical Engineers was told recently.

Both commercial and military aircraft, it was said, will quickly receive required up-to-date information concerning weather along flight paths and at destinations.

The system will transmit data and messages at the rate of 1,000 words per minute with 1,000 stations sending and as many as 5,000 stations receiving, it was disclosed in a paper by E. E. Schwenzfeger, member of the technical staff at the Bell Telephone Laboratories, New York, N.Y. The present system transmits just 75 words per minute.

Two other major improvements of the new system, which together with its transmission speed account for its 20-fold improvement over the existing system, are the reception of useful information only by the receiving stations and the elimination of switching delays.

At present, Mr. Schwenzfeger pointed out, receiving stations must accept all information transmitted. It is estimated that at least 25 per cent of the data received by the average station is unwanted.

Also, he said, "A considerable but undetermined amount of data received in the existing system is obsolete because of switching delays encountered between transmitters and receivers. Switching delays do not occur in the proposed system because there are no centralized switching points to introduce delays."

The end product at receiving stations, he said, will be printed page copy with provision for feeding data directly into numerical weather computing machines without the need for human intervention.

"The (proposed) system," he said, ". . . is in effect based on the old telephone party-line concept in which any or all subscribers could listen in on any or all conversations if they wished."

Fast, accurate, up-to-date information, he said will be particularly beneficial to jet aircraft which consume large amounts of fuel at low altitudes when making approaches for landings. Slow transmission of information can result in additional approaches being necessary, he said.

"CAT-EYE"

OUTER space seems to have an irresistable lure for ITT men. When they are not tracking missiles, or trying to bounce TV off of satellites, they work with telescopes. Out of this has come an application for an electronic camera that will take better pictures of the planets than other cameras.

A regular film-type camera has difficulty taking clear pictures of heavenly bodies because of the "jitter" effect of the earth's atmosphere. Even nearby planets require long exposures, and during the exposure, the jitter effect can cause blurring of the picture.

ITT's system, however, uses electronic amplification, and enables the taking of a picture in a few thousandths of a second. This rapid exposure overcomes the atmospheric disturbance problem.

DIRECTION FINDER

RADIO has long been used for direction finding purposes; even a small transistor radio can be used to tell you where you are. The reverse is also true. If you are receiving a radio signal, you can tell the direction from which it is coming. Although these tricks are of great use to small boat owners, they also have an important military significance.

In World War II, elaborate systems were devised for locating enemy radar and radio stations. Among these systems was a German development called "Wullenweber."

Now we have a Wullenweber system of our own at Urbana, Illinois. The International Telephone & Telegraph Corp. is building it for the U. S. Navy. It consists of a circle, 1,000 feet in diameter of 70 foot poles. One hundred and twenty poles are used, each of which carries a radio receiving antenna. The antennas connect to a goniometer—a device which simulates rotation of the antenna directional characteristics. This permits the system to "look" in one direction at a time.

After the Navy uses the new antenna system, it is to be used by the University of Illinois for research.

ITT is an old hand at direction finding. In World War II, their laboratories developed a direction finder for military use. With the aid of this system, shore stations and

hunter-killer groups of destroyers were able to pin-point the location of Nazi submarines when they surfaced to communicate by radio.

NEW FREQUENCY STANDARD

FOR checking and readjusting a radio relay system oscillator that operates at a fixed frequency near 15 megacycles, a portable frequency standard was designed that is accurate to one part in a million. It is stable to within 15 cps out of 15 mc.

Comparable with the best commercial fixed-station oscillators, the entire unit—including its case—is not much larger than a miniature camera.

Four Bell Laboratories' developments contributed to the frequency standard's high accuracy and small size:

(1) A new quartz crystal unit.
(2) A temperature-compensating circuit.
(3) Transistors.
(4) A voltage reference diode.

While designed to operate at about 15 mc, the standard should be suitable over the range of 5 to 50 mc with appropriate crystal unit and circuit reactances.

INSULATION

ONE of the problems that has eternally plagued the electrical business is the finding of an insulating material that is flexible, nonporous and which will not deteriorate with heat.

Bell Telephone Laboratories has just come up with an idea which might meet this problem. Furthermore, the new insulation is created out of the wire itself. It seems that if clean copper or aluminum wire is exposed to an atmosphere of fluorine or hydrogen fluoride, a layer of metallic fluoride will develop on the wire. This layer of fluoride is an insulator that will remain intact under the stress of 90° bends. Although only a few microns thick, the insulation does not break down at 450 volts at 500° Centigrade.

AURAL vs. VISUAL DELAY

EVER since the earliest days of talking movies, there has been a problem in keeping picture and speech synchronized. Improved techniques took care of the problem in the motion picture field, but television brought a new outburst of the trouble. Reason for this is the fact that TV pictures, when sent over telephone networks, usually travel on coaxial cable or microwave links.

The voice portion of the program, on the other hand, usually travels over speech circuits, most of which are carrier-derived. Special channel units in carrier systems are employed which provide a high grade channel for the TV sound, by combining the channels used by two or more telephone speech channels.

However, a problem arises when terminal equipment is encountered on the carrier system. In some hookups, the program channel may have to switch from one system to another in order to get to its destination. On carrier systems where a drop-out of speech channels is made at way points, a through program channel in effect goes through two sets of terminal equipment at such points. That is, the program is taken off one carrier, and then put back on another.

All of this results in a delay in transmission of the sound. The human ear is quite sensitive to such delays, and when the sound arrives more than 55 milliseconds late, it is obvious to some that the sound and picture are out of step.

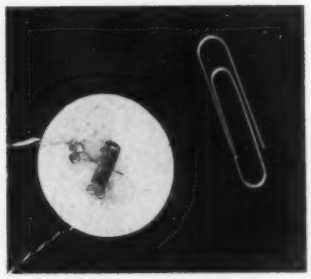
So, as is usual in such cases as this, the Bell Laboratories has come up with an answer. The trick is done with carrier by-pass equipment, which shunts the carrier around the terminal equipment at points where telephone message channels must be "dropped-out" of the system.

FIELD DETECTOR

ONE of the stickiest problems in the communications business is the location of a source of interference. Various loops and probes have been designed for the purpose, but it is generally difficult to pin-point exact sources.

Now the Armour Research Foundation (ARF) of the Illinois Institute of Technology has developed a field detector that promises much.

The new gadget is a tiny cell made of a semiconductor, indium antimonide. It operates on the Hall-effect principle, which occurs when a transverse magnetic field is applied to a current-carrying conductor. The magnetic field exerts a force on the charges in the direction perpendicu-



Hall-effect sensor shown on a ceramic mount. Developed by electrical engineers at Armour Research Foundation of Illinois Institute of Technology, the sensor's small size (here shown with paper clip) makes it valuable in measuring radio interference in confined areas around communications equipment.

lar to both the current and the magnetic flux density, the deflected charges producing a field in the direction of the force.

Engineers have been able to produce pickup cells as small as ⅛ inch wide by ⅛ inch long by .01 inch thick.

The probe will permit more accurate measurements than are possible with a loop. It will eventually make possible a decrease in radio interference in the low frequency ranges which will improve reliability of communication links.

Although ARF did not elaborate on the communication applications, low frequency radio interference would appear to include telephone carrier applications.

SEX DETECTOR

AN even more intimate application of electronics is the newly developed radar set which can identify the sex of a person walking some distance away. A military development, the radar is designed to identify moving objects at distances up to 20,000 yards.

The radar works on the principle of the "doppler effect." When a radio beam is reflected from a moving object, the movement of the object adds or subtracts from the speed of the radio wave. Thus the reflected wave will be of slightly different frequency compared to the transmitted wave. Comparison of the two produces a difference frequency from which the speed of the distant object can be determined.

The radar used by highway patrolmen to clock the speed of automobiles uses this principle. Although the new radar is not effective at very low speeds, such as that of a crawling man, the movement of his arms would be detected.

The machine can tell the difference between a walking man and a walking woman, because the latter tosses her hips about more. The radar, like most men, has an eye for flouncing female hips. The new instrument is being made by the Hazeltine Corp., of Great Neck, N.Y.

BURIED WIRE

A TYPE of buried telephone wire which compares favorably in cost with open wire construction was described to the American Institute of Electrical Engineers recently.

The new wire was developed by engineers of the Rural Electrification Administration.

Advertisement

How To Get Your Money's Worth From Electronic Equipment!

THE TELEPHONE industry is rapidly taking advantage of new developments in electronics. This is only natural. Since the telephone first came into existence, telephone men have been quick to recognize the value of new developments.

Thus it is not surprising that the industry is using more and more electronic equipment. Mobile radio is used to connect telephones in cars, trucks and other vehicles. Microwave relay links are used in place of wire and cable in many places. Electronic carrier

Carl E. Smith, E. E., President
Cleveland Institute of
Radio Electronics

circuits and repeaters result in better utilization of existing (and proposed) facilities.

All of these improvements are available today. Tomorrow will see even greater advances. The manufacturers of telephone equipment can be relied upon to give you the kind of equipment you need to fulfill your obligations to your subscribers.

However, you should keep in mind a fundamental principle of management . . . a chain is only as strong as its weakest link. Thus, no matter how big or small you may be, your equipment will not give maximum performance unless it is maintained by competent technicians.

Every company has a technical staff. It may consist of hundreds or perhaps thousands of men . . . or there may be only two or three. These men know and understand telephone technology as it used to be, but in all honesty, do they understand the fundamentals of electronic circuitry?

If they aren't on speaking terms with oscillators . . . rectifiers . . . amplifiers . . . transistors . . . etc., they are not going to be able to give you the technical support you need. A man may be able to wire a central office switchboard in the dark, but if he isn't skilled in the mental tools of electronics, your new equipment will not give you the service you paid for.

In all probability your present staff is very capable. You wouldn't have one which didn't give you the reliability you must have. Therefore they are the logical men to take on the maintenance of electronic equipment . . . as soon as they have received a sound foundation of electronic fundamentals.

This can be done economically and without the loss of valuable man hours by a non-resident training program. Several schools offer this service. They teach your men the fundamentals of electronic circuits. Then, with the ability to understand the principles of any electronic device, your company and the equipment manufacturer have only to conduct a brief orientation of the specialized equipment.

This plan has been used successfully by many companies. It has helped them . . . and it can help you. It will pay you to investigate and get the facts.

For full information on schools providing training in electronic theory and FCC license preparation, write to the National Home Study Council, 1420 New York Avenue, N. W., Washington 5, D. C.

If you would like the details on a "guaranteed" Employers Plan for training technical personnel, write to

THE REGISTRAR
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CLEVELAND 3, OHIO

Quality construction is an important factor to the man who selects dial switching equipment. That's why so many telephone men have toured our factory at Northlake, Illinois, to see the entire manufacturing process of Strowger equipment. They've seen how raw materials are carefully inspected for quality. They've observed the close tolerances to which each Strowger part is manufactured to insure ease of adjustment. They've watched the accurate control that is applied in the finishing of Strowger parts to provide good fit and lifetime protection. And, they've noted the constant inspection of these parts during every stage of production. No wonder so many telephone men choose Strowger!

QUALITY CONSTRUCTION...

another reason why telephone men choose Strowger!

FIND OUT FOR YOURSELF! The next time you're in the Chicago area, come and visit us. We'll be glad to show you through our entire Northlake plant. You'll see the unsurpassed quality and craftsmanship in the construction of Strowger. To make arrangements for your tour, write Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC GENERAL SYSTEM

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Complete USITA'S Second Annual Management Development Course

By Dan S. Fargo

PARTICIPANTS from 18 companies in 17 states on Aug. 7 completed at the University of Kansas, Lawrence, the second annual Management Development Program sponsored by the United States Independent Telephone Association for executives of Independent telephone companies.

At ceremonies on that date, graduates were presented certificates denoting successful completion of the intensive four-week course by Dr. John H. Nelson, dean of the Graduate School of the University of Kansas.

The program, designed to help executives do a more effective job in their current positions and to help them prepare for more challenging responsibilities, was planned by the Personnel Committee of the USITA and the University of Kansas School of Business, which presented the program. Instruction by authorities in the respective fields was within the areas of functions of administration, the American business climate, and rate regulation.

The functions of administration area of the course is subdivided into control and financial administration, human relations in business, merchandising and administrative policy and planning. In these the case method of instruction is used almost exclusively. This requires the individual first to analyze an actual business problem and then to test his ideas about the case against those of his colleagues and the instructor. Out of this steady diet of case problem analysis and discussion the individual can expect real improvement in his ability to analyze business problems,

The USITA's Management Development Program at the University of Kansas was not all work. Out for this "coffee break" were (reading from left to right without distinguishing rows): Hodgen O. Patrick of Santa Monica, Cal.; John Louis Runkle of Hickory, N.C.; Allan E. Lindekugel of Fairmont, Minn.; Jack A. Grossman of Rochester, New York; Berlin Johnson of Charlottesville, Virginia; Richard Lashley, University of Kansas, Lawrence; Benjamin Kauahikaua of Honolulu, Hawaii; C. Frederick Roth, (back, partly hidden), New York, New York; Russell Logue of Casey, Ill.; E. D. Wilkinson (back, partly hidden) of Tallahassee, Fla.; Stewart W. Phillips of Erie, Penn.; Dewey H. F. Wong (back, partly hidden) of Honolulu, Hawaii; Edward G. Nelson, University of Kansas; John D. Cooper, Rochester, N.Y.; Marvin E. Winans of Everett, Wash.; Floyd L. Reyher (standing on a chair) of Haxtun, Colorado; B. F. Stalter of Plymouth, Wis.; John H. McHenry of Jefferson City, Mo.; John J. Clarke of Monrovia, Cal.; Wayne A. Johnson (standing on chair) of Everett, Wash.; Herman Graves (front, wearing glasses) of Brownwood, Tex.; Kenneth A. Young (back, partly hidden) of Fort Dodge, Ia.; Chris B. Hansen of Elkhart, Ind.; Dick F. Perley (back, wearing glasses, partly hidden) of Des Plaines, Ill.; Dusty Kemper of Brownfield, Tex.; John R. Yeager (bow tie), Harvard University, Cambridge, Mass. and Charles P. Lamm of Charlottesville, Va.

Classroom scene during USITA's Management Development Program. From left to right: Hodgen O. Patrick of Santa Monica, Calif.; Allan E. Lindekugel of Fairmont, Minn.; Marvin E. Winans of Everett, Wash.; Chris B. Hansen of Elkhart, Ind.; John D. Cooper of Rochester, N.Y. Right side of the U-shaped table, facing the left, left to right in the picture: Benjamin Kauahikaua and Dewey H. F. Wong, both of Honolulu, Hawaii; Dick F. Perley, Des Plaines, Ill.; Wayne A. Johnson, Everett, Wash.; Frank Pinet (standing in front of table) of the University of Kansas, and C. Frederick Roth of New York City.

make better decisions and to communicate more effectively with business associates.

The second series in the program—the American business climate—is designed to help the executive understand more about himself and the problems of his work by relating each to his society. This part focuses on the development of the whole community—local, regional and national. Without such a focus, the program's developers believe, the administrator often tends to see his company in isolation. He fails, they feel, to understand how he is molding society and how simultaneously society is molding him.

In the program's third section, rate regulation, topics such as theory of regulation, current trends in regulation, and management's responsibility with respect to rate regulation, were covered. The rate regulation series was scheduled for last week of the session so that the study of rate-making could be built on the work done in the classes on control and financial administration (part of the first series). The 1959 course also devoted more attention to the preparation of rate cases.

Hugh A. Barnhart, president of the United States Independent Telephone Association, and also president of the Rochester (Ind.) Telephone Company, Inc., made the commencement address at the Aug. 7 ceremony. He told the graduates:

"Personally, I feel that you are in the most interesting and most promising business in existence today. Although we have made significant strides over the years, I believe along with many others the brightest era and largest opportunities lie ahead. . . .

"As evidence that we are at the eve of an even more dynamic era, I cite the fact that business, government and our educational institutions are spending 9 billion dollars this year on research and development. This is more than three times the amount spent on research and development just 10 years ago. It is reliably estimated that approximately 120 billion dollars will be spent on research in the next decade—more than the total national investment in science from 1776 down to the present moment.

"This means that we now have in our laboratories developments in the fields of medical technology, power, production, distribution, agriculture, metallurgy, transportation, communication, education, warfare, planning, and management which will, when perfected, be revolutionary in their application. This means that we have a solid basis for continued progress, growth and prosperity. This means that the many things and processes which will be commonplace 30 years from now, though unknown today, undoubtedly will dwarf the many advancements we have made during the past 30 years."

Mr. Barnhart said he feels "bullish" about the Independent telephone industry because at the end of World War II the Independents had about 5 million stations in service whereas today they have well over 10 million. Also, operating as they do in many of the suburban areas adjacent to large population cen-

(Please turn to page 44)

Cover Photo Identification

The USITA Management Development Program graduation day, culmination of four weeks of intensive study. As this shot was taken the following were in the camera range:

FRONT ROW, left to right: John J. Clarke of Monrovia, Cal.; John D. Cooper of Rochester, N.Y.; Herman Graves of Brownwood, Tex., and Jack A. Grossman of Rochester, N.Y.

SECOND ROW: Dusty Kemper of Brownfield, Tex.; Charles P. Lamm of Charlottesville, Virginia; Russell Logue of Casey, Ill.; Allan E. Lindkugel of Fairmont, Minn.; John H. McHenry of Jefferson City, Mo., and Hodgen O. Patrick of Santa Monica, Cal.

THIRD ROW: C. Frederick Roth of New York, N. Y.; John Louis Runkle of Hickory, N. C.; B. F. Stalter of Plymouth, Wis.; E. D. Wilkinson of Tallahassee, Fla.; Marvin E. Winans of Everett, Wash.; Dewey H. F. Wong of Honolulu, Hawaii, and Kenneth A. Young of Fort Dodge, Ia.

Others of interest (FOURTH ROW): Douglas Gleason (gentleman wearing glasses, his arm resting on the back of his chair), secretary of the Kansas Telephone Association; Frank Pinet (bow tie), University of Kansas, and A. J. G. Priest (nearly hidden, seated next to Frank Pinet), University of Virginia, Charlottesville, Va.

FIFTH ROW: Edward G. Nelson (light colored suit, his arm resting on vacant chair to his right), University of Kansas; Kenneth L. Dally (on Mr. Nelson's left), Member of USITA Personnel Committee, Central Telephone Co., Lincoln, Neb., and Toral F. Duckett (on Mr. Dally's left), Central Telephone Co., Lincoln, Neb.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE U. S. DEPARTMENT of Health, Education & Welfare has installed seat belts in 500 of its automobiles. Accident studies have revealed that major injuries will be reduced by more than 30 per cent if seat belts in automobiles are used.

A campaign to popularize the use of seat belts in passenger cars has been announced by three national safety health organizations. Business and industry will support the campaign by promotion, installation and use of seat belts in the cars of their employes.

•

We were surprised to learn from statistics recently compiled by the USITA that there are 344,181 magneto telephones still in use in this country and its possessions. Approximately 305,000 of these are operated by Independents and 38,000 by the Bell System.

There are also 4,761,465 common battery telephones still in service in this country. The Independents operate 1,731,450 and the Bell 3,030,015.

•

We are told that in England the emergency telephone numbers listed in the newly-decorated guard room at St. James' Palace are those of Buckingham Palace, Scotland Yard, the War Office, and a firm of television repairmen.

•

Our good friend, Dermot Foley, in California, informs us that in the San Diego area they are adapting the cable record book information to the needs of the cable splicing forces without the time consuming job of transcribing it by hand, 25 items to a sheet, as has been done in the past. Verifax copies are made of the cable record sheets for use of the splicer in the field.

Information necessary to make a cable transfer or throw is contained in the cable book, with the exception of the central office equipment. The equipment, such as group and terminal, etc., usually remains the same when only the pairs are changing. When changes such as splitting or regrouping party lines are involved in the transfer, the required information is noted in the cable book and underlined in red.

The Verifax copy should also indicate important circuits such as leased wires, fire alarms and other services on which it is necessary to obtain release from the customer through the test board, before a transfer is made. Defective pairs should also be noted. The splicer should identify the trouble, open the pair and determine whether it is between the splice and the office or beyond.

This appears to be a good time-saving arrangement. The Verifax, or any good duplicating device, may be used to advantage for this purpose.

•

We have a letter from Bill Dillon, of the W. C. Dillon Co. in California, informing us that he had recently celebrated his 81st birthday. The Dillon clan met for the celebration and Bill showed off by placing more shots in the black spot on the target at 75 feet, with either hand, using his 357 Magnum Colt six-shot revolver, than any of the sons or grandsons present. This would certainly seem to indicate that Bill's nerves and eyes continue to "do their stuff."

•

There are two schools of thought as to whether switchboard operating rooms in an air-conditioned building should have windows. Some claim that if windows are provided so that operators can look out occasionally, they are more cheerful and contented. Even though the outside scenery may not be overly attractive, if they can look out to inspect the weather occasionally, it seems to help.

When windows are not provided, a recorded weather announcement arranged so that operators may listen in on it helps considerably. Picture wallpaper or pictures of scenic beauty also prove helpful.

Whether or not background music proves an advantage in a switchboard operating room is also a controversial subject. It is generally agreed, however, that music is beneficial if provided part-time only. If it is on continuously, it tends to become monotonous.

•

We have a report which states that when temperature was added to the time announcement service in Tampa, Fla., the usage of the service was increased 30 per cent over the traffic generated by time alone.

This confirms our opinion that time and temperature play a most important part in the lives of all of us.

•

The Chesapeake & Potomac Telephone Co. of Virginia on June 1, 1959 became the first company in the Bell System to have an operating district with all cables completely pressurized. The Norfolk Elsewhere district, with over 1,300 miles of cable, is now completely under pressure with a minimum of two pounds of pressure on the entire cable network, monitored by pressure contactors.

This method of maintenance has reduced the number of service interruptions by approximately 80 per cent and upkeep costs by 30 to 40 per cent. With the advent of data transmission, private line service and line concentrators, the reduction in trouble is becoming more and more essential.

It is planned that the remaining cable in Virginia will be completely pressurized by the end of 1960. When this objective is reached, the company will realize savings in maintenance to one-half million dollars each year, and the telephone users will be provided a better grade of service, with very few, if any, interruptions.

Courts and Commissions

Lincoln T&T Asks New PBX Regulations in Nebraska

The Lincoln Telephone & Telegraph Co. on July 31 filed applications with the Nebraska Railway Commission asking permission to:

● Install No. 1, 2, and 3 PBX systems without an initial contract period. However, requests for No. 1 systems which involve an installation of unusually large size or where unusual conditions prevail would be excepted. In these cases a five-year contract will be required. All No. 4 PBX systems (large automatic systems) would be furnished with an initial contract period of five years.

● Offer a "quick call" service to No. 4 PBX subscribers. This equipment includes a compact cabinet suitable for a desk location, relay equipment, and a terminal box.

It may be used in connection with Type 4D or 4E PABX equipment and is designed to connect the calling party instantly with the PABX station desired without dialing by pressing a button in the cabinet.

The capacity of the unit is 20 stations and its operation may be arranged to provide a background tone to busy stations or to override busy station conditions.

A monthly rate of $15 was requested for cabinets equipped for 20 stations with an installation charge of $2.00 per station.

● Discontinue a 50 per cent surcharge on exchange trunks connected to PBX systems owned by the United States Air Force, Army or Navy.

Mo. Court Asked To Review Rate Suspension Refusal

The cities of Columbia and Centralia have asked the Cole County Circuit Court to review the action of the Missouri Public Service Commission in refusing to suspend rates granted General Telephone Co. of Missouri pending a Sept. 16 hearing (TELEPHONY, Aug. 15).

The cities are protesting a $400,000 rate increase granted the company and had been granted a hearing on the reasonableness of the rates.

Company Asks $4,146 Raise; Seek Sale Approval in W. Va.

The West Virginia Public Service Commission on Aug. 10 heard two applications:

Clay Telephone Co. asked to increase its revenues by $4,146 annually.

Marion Telephone Co., Worthington, asked permission to sell to the United Utilities of West Virginia, Inc., Davis.

Fla. High Court Returns Rate Bid to Commission

The Florida Supreme Court, it was reported on Aug. 18, has handed down a decision nullifying a temporary rate increase granted to the Southeastern Telephone Co., Tallahassee, in 15 communities in the northwest part of the state.

The state supreme court upheld an appellate court decision which reversed an earlier Leon Circuit Court injunction directing the Florida Railroad & Public Utilities commission not to interfere with the temporary rate increase.

The company's plea for an immediate court order was denied (TELEPHONY, Jan. 17). The commission granted the company proposed rate increases on a temporary basis, requiring Southeastern to post bond to insure that the money would be refunded if the full increase was not made permanent.

Several cities protested the temporary order, and the commission reversed itself and voided the increases.

Next, the Southeastern company won the injunction in circuit court prohibiting the commission from vacating the rate increase without a public hearing. The district appellate court reversed the lower court's order, and ruled that the commission was quasi-judicial in nature and could correct or amend the temporary increase without a public hearing.

Now, as a result of the ruling by the Florida Supreme Court, the whole matter was returned to the commission for a decision on the permanent increase, for which the company filed on Mar. 7, 1958.

Refunds by the company, a Tallahassee attorney said, could amount to more than $500,000. Tallahassee, as well as the following cities, would be affected by the rate increase: Crawsfordville, Crestview, De Funiak Springs, Destin, Fort Walton Beach, Greenville, Madison, Monticello, Niceville, Panacea, Shalimar, St. Marks, Sopchoppy, and Valparaiso.

Authorize New Schedule Of Rates in Minnesota

The Minnesota Railroad & Warehouse Commission on Aug. 17 approved a new schedule of rates and charges for the Wikstrom Telephone Co., Karlstad.

The company filed its application for new rates on July 22. It stated that it had converted its Donaldson, Karlstad and Strandquist exchanges to automatic operation in April, 1958 financed through a $300,000 REA loan. The company later acquired the Halma, Greenbush and Viking exchanges, and has allocated $540,000 for cut-over to automatic operation of the three.

The Wikstrom company proposed "some upward rate adjustment for its present automatic exchanges, in addition to the proposed automatic rates for Viking and Halma to be cut over in January, 1960, and for the Greenbush exchange, to be cut over in July, 1960.

Already operating the Donaldson, Karlstad and Strandquist exchanges, serving 419 stations, the company said it would, on cut-over of the Greenbush, Halma and Viking exchanges, serve a total of 1,209 stations.

Present net operating revenues were shown as $44,197 as against a proposed revenue of $94,259. The loss yearly was

(Please turn to page 40)

Builder Howard B. Quinn of Chicago, Illinois. Behind him is one of 200 new homes in his "Beverley Terrace" development. Each of these homes has no less than 10 telephone outlets.

Why more new homes than ever are being

"TELEPHONE PLANNED"

A Telephone Planned house is one that makes provision for present and future telephone needs. Convenient outlets are in place wherever extension phones will be wanted; the wiring is concealed in the walls.

No wonder, therefore, that Telephone Planning makes a hit with home buyers! And so much of a hit, in fact, that builders throughout the country are recognizing it as a potent factor in home sales.

This recognition is helped by a year-round Bell System advertising campaign addressed to builders in their trade magazines. Because it's nationwide, this advertising does a selling job for telephone companies everywhere. Extensions can be sold more readily when the outlets are installed and waiting. And customers are pleased when their telephone service is attractively "built in" the modern way.

BELL TELEPHONE SYSTEM

NUMBER 17 - *Toll Grade. Has about the longest leakage path possible with a single petticoat. For exchange circuits and lines not exceeding ten miles.*

HEMINGRAY INSULATORS

Easily and Economically Installed

Hemingray Glass Insulators stand up under severe conditions, do not deteriorate, provide the service you need to assure continuous operation of communication lines. The dependability of Hemingray Insulators as proved by their years of sturdy performance is one of the reasons behind their world-wide acceptance.

Hemingray has pioneered many insulator developments to keep pace with requirements, improve communication systems, assure you a dependable source of supply.

The immediate availability of these insulators is further assurance of Hemingray dependability. An up to date distribution system makes Hemingray Insulators available when you want them and where you need them.

Hemingray Glass Insulators are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

There's a Hemingray Insulator to meet every communication line requirement.

World standard for quality Since 1870

HEMINGRAY INSULATORS
AN (I) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

$21,570 compared to a proposed net income of $19,538. The ratio of net income to the $784,244 current value rate base showed a loss in the present operation compared to 2.49 per cent return under proposed rates.

The commission concluded that the company's present rates "will be unreasonable" after completion of the proposed improvements; and said that the proposed rates are reasonable and will result in a fair return upon the fair value of the property.

The schedules prescribed for Karlstad, Donaldson, Strandquist, Halma, Viking, and Greenbush are as follows:

	Karlstad, Donaldson, Strandquist, Halma, and Greenbush	*Viking*
One-party business	$8.75	$8.00
Two-party business	8.00	7.25
Rural multi-party business	6.25	—
One-party residence	5.75	5.00
Two-party residence	5.00	4.25
Four-party residence	4.50	3.75
Rural multi-party	4.75	4.00

Independent of N. Y. Offers Shareholders Common Stock

Independent Telephone Corp., Dryden, N. Y., on Aug. 11 offered 96,604 shares of its common stock to the holders of its outstanding common stock of record at the close of business on June 30, 1959.

The offer was made on the basis of one share for each two shares of the common stock then held. The subscription price is $6.25 per share.

Concurrently the Independent company disclosed that it plans to acquire an additional operating company, Farmers Union Telephone Co., Sussex, N. J. Independent already has seven operating company subsidiaries in New York, Michigan, and West Virginia.

Permission to acquire control of the Farmers Union company has been granted Independent by the New Jersey Board of Public Utilities Commissioners and the New York Public Service Commission.

The prospectus filed with the Securities & Exchange Commission also reveals that the holders of more than 80 per cent of Farmers' common stock already have approved the proposal.

Independent Telephone Corp. was set up as a holding company in Sept. 1955. It provides services to its operating subsidiaries and to affiliated operating companies.

Independent operates the following subsidiaries:

Allegany Telephone Co., Inc., renders telephone service in Alfred, Almond, and Andover, New York.

Dryden Telephone Corp. provides

telephone service in Dryden, Freeville, Etna, Harford, North Harford, and Virgil, New York.

The Fillmore Telephone Co. operates an exchange in Fillmore, New York. The exchange was converted to automatic operation in May 1959 in partial completion of a $350,000 expansion and modernization program begun by the company in 1956 after its acquisition by Independent.

Moore Telephone System, Inc. Caro, Mich., is the third largest telephone company in the state of Michigan, and provides telephone service from two central office exchanges, both automatically operated, situated in the city of Caro and the village of Marlette. These communities are approximately 100 miles north of the city of Detroit.

In addition to such local service, the Moore company has toll lines extending to eight other cities or villages from a primary toll center at Caro, connecting with the lines of Michigan Bell Telephone Co. and the American Telephone & Telegraph System.

Sanborn Telephone Co., Inc. provides telephone service in New York to Sanborn, Pekin and Bergholtz.

The United Telephone Co., St. Marys, W. Va., provides telephone service in the city of St. Marys and the village of Belmont.

The West Valley Telephone Co. operates an automatic exchange located at West Valley, N. Y.

Farmers Union Telephone Co. is providing service in the borough of Sussex, N. J.

It functions also in the village of Unionville, N. Y.

Present plans anticipate that Farmers will embark on an extensive construction program this fall. The program is expected to cost approximately 1.7 million dollars. It contemplates the construction of a new central office building in Sussex.

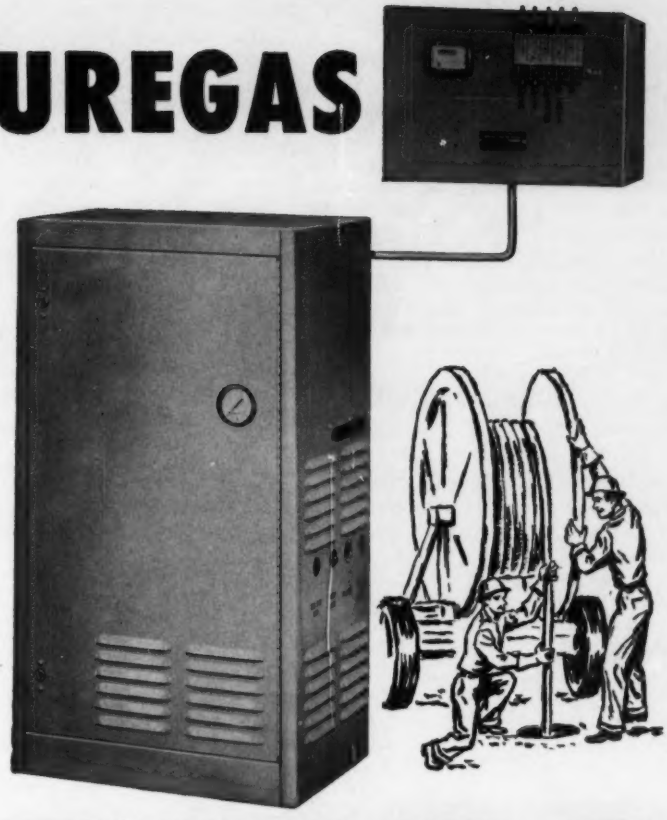
Independent Telephone Corp. stated its policy is to retain the managements of the operating companies it acquires.

Officers and directors of Independent are: A. Marvin Braverman; William B. Harrison, president and director; W. Bradford Harrison, vice president, comptroller and director; Irving H. Isaac, vice president and director; Adrian C. Leiby; Donald S. Stralem; Pierre Stralem; and Chauncey P. Williams Jr., secretary-treasurer.

FCC OK's Bell Purchase in Ill.

The Federal Communications Commission recently approved the application of the Illinois Bell Telephone Co. to purchase the Coal Valley Mutual Telephone Co. (TELEPHONY, Oct. 4,

PEC PUREGAS



PRESSURIZED DRY AIR
stops cable moisture

Under ground—Above ground, pressurized dry air keeps moisture out of cables and keeps conductors dry. PUREGAS equipment automatically maintains dry air pressure all along the line.

Constant air pressure stops water and corrosive fumes from penetrating cable sheath breaks, as PUREGAS equipment automatically responds by increasing air flow in the affected cable. In addition to this advantage, dry air prevents condensation from forming inside the cable regardless of outside air temperature.

PUREGAS equipment quickly recovers its investment by adding to cable life, and reducing maintenance costs while protecting circuit continuity. This is why more and more cable networks throughout the country are being pressurized with PUREGAS dry air equipment.

To increase subscriber satisfaction and cut operating costs, investigate PUREGAS pressurized dry air. Send for new technical information on "Why cables should be pressurized."

PEC PUREGAS EQUIPMENT CORP.
578 OAK STREET
COPIAGUE, L. I., N. Y.

1958). The Coal Valley company serves approximately 185 subscribers.

Uphold N. J. Bell Service Denial to Race Tipster

The New Jersey Public Utility Commission on Aug. 3 upheld the refusal of the New Jersey Bell Telephone Co. to install 20 telephones for a man who said he wanted to start a horse racing information service.

Albert Rogalsy of Saddle River maintained that he wanted the telephones installed in a Passaic office. He stated he would charge customers $10 weekly for this service.

New Jersey Bell said the installation would constitute an aid to illegal gambling.

Canadian Company Asks First Raise in 10 Years

The Rochester Municipal Telephone System, Woodslee, has applied to the Ontario Municipal Board for a rate increase, it was reported on Aug. 18.

The Rochester company serves 1,000 subscribers.

Frank Trepanier, system secretary, said the increase is the first the company has sought in 10 years. He said the system has been operating at a small deficit for the past three years.

The company plans to put the increase into effect Jan. 1, 1960.

Authorize Sale of Two Minnesota Independents

The Minnesota Railroad & Warehouse Commission on Aug. 17 approved the sale of the Lake Park Telephone Co., through its receiver, Henry G. Torgerson, to the Hohman Telephone Co., of Pelican Rapids. The Lake Park company serves approximately 491 stations.

On the same day, the commission also authorized the sale of the North Star Telephone Co., Mountain Lake, to the North Star Telephone Co., Inc.

The North Star company has been serving subscribers in Mountain Lake, Butterfield, Darfur, Delft, Comfrey, Odin, Ormsby, and adjoining rural territory. It operates approximately 2,563 stations.

Sentence Wis. Paystation Thief

Charged with theft and criminal damage to property in the looting of Wisconsin Telephone Co. paystation coin boxes, Robert E. Marshall on Aug. 12 was sentenced in district court in Milwaukee to two concurrent six-month terms in the house of correction. District Judge Robert W. Hansen ignored a probation department recommendation for probation in sentencing Marshall. Marshall admitted looting 12 paystations.

Hear Four Bids to Sell And Rate Request in Wis.

The Wisconsin Public Service Commission was to have held hearings on Aug. 26 on these joint applications:

The Sylvan, Soldiers Grove Farmers Mutual Telephone Co.'s request to sell its lines to the Richland-Grant Telephone Cooperative, Inc., the facilities to be improved, EAS to be established, and rates for the new subscribers to be set up.

The Clayton Mutual Telephone Co.'s request to sell its lines to Richland-Grant, such facilities to be improved, and new rates established for the subscribers thus acquired.

The Home Telephone Co.'s request to sell its lines to Richland-Grant, such facilities to be improved, and new rates to be established for the acquired customers.

•

Also on Aug. 26, the commission was to hear the application of the Cream Valley Telephone Co., Hawkins, for authority to increase the rates at its Glen Flora exchange.

•

Another hearing was scheduled for Aug. 27 on the request of the Elroy Telephone Co. to sell its property to the North-West Telephone Co., Tomah.

Approve Sale in Kentucky

The Kentucky Public Service Commission recently granted permission to the Rochester Telephone Co. to sell its property to the Logan County Rural Telephone Cooperative, Auburn, according to Lenn J. Smith, former owner of the Rochester company. The Rochester Independent provided magneto service to 74 subscribers. Logan County plans to build a new automatic central office in Rochester.

Register Stock With SEC

West Coast Telephone Co., Everett, Wash., has filed a registration statement with the Securities & Exchange Commission for 135,000 shares of common stock, 125,000 to be offered publicly and 10,000 reserved for an employe stock option plan. Blyth & Co., Inc. heads the underwriting group. The company, according to an Aug. 17 report, said the proceeds would be used to repay bank loans incurred for construction and for further expansion.

new!

TERMINAL FITTING —HOUSING FOR FIVE CONNECTORS

Used with the Bell System Call Director Telephone, Wiremold's 2857T Terminal Fitting effectively provides an ideal housing for cable connectors. Of rugged diecast aluminum, it can be mounted on floors, walls, desks (side or kneehole).

For away-from-wall locations, Pancake 2800 Overfloor Duct is the neat way to house and protect the cable. Fitting and duct both hold 100- or 75-pair cable.

Get the full story from Wiremold or your electrical distributor.

THE WIREMOLD® COMPANY

HARTFORD 10, CONNECTICUT ADams 3-6251

Fifty Governors Join in Conference Call Promotion

A telephone conference hookup took place recently when 50 state governors were joined in conversation. The occasion was for arranging the details of the premiere of the movie, "John Paul Jones."

Arizona Governor Paul Fannin, Phoenix, and Admiral Arleigh Burke, Chief of Naval Operations, Washington, D. C., told the listening governors that the premiere in each state capital will be held as a benefit for the enshrinement of the sunken U.S.S. Arizona in Pearl Harbor.

Governor Fannin revealed during the call that the Arizona Memorial is the first American memorial to be built on American soil at the actual site of an enemy attack.

Indiana Company Completes $100,000 DDD Expansion

The Bremen (Ind.) Telephone Corp. on Aug. 16 culminated a $100,000 expansion program started a year ago. Bremen subscribers are now a part of the nationwide Direct Distance Dialing network and are able to dial most of their own station-to-station long distance calls.

Joe Novak, company manager, states that Bremen is the first exchange in Indiana not associated with Indiana Bell Telephone Co., General Telephone & Electronics Corp. or United Telephone Co. to offer DDD. This was possible, he says, because no toll ticketing equipment was needed in Bremen.

Access to DDD is through the CAMA equipment located in Indiana Bell's exchange at South Bend when it was originally placed in service in July 1956. The local and dial trunking equipment was installed by the Automatic Electric Co.

In addition to DDD, a sufficient amount of cable was placed in service to assure adequate outside facilities for several years to come, Mr. Novak reports. Also installed were 300 lines of automatic switchboard equipment which supplemented the 700 lines that had previously been in service.

Mr. Novak also reported having installed a Leich line concentrator which will allow service to 49 lines at the Lake of the Woods area while using only 11 cable pairs. Also there are two recently-developed Lynch toll line carriers which increased by eight the number of trunk circuits to South Bend, making a total of 26. The carrier is compatible with Western Electric equipment in South Bend. Both telephone companies, therefore, are able to standardize on the manufacturer's equipment of their own choice.

KELLOGG

Transistor Ringing Generator

low cost solution for ringing problems

- **Increased Ringing Power** – up to 50 watts output per ringing frequency.
- **Operates from central office power supply** – a second TRG can be used as standby, with no need for switchover equipment if commercial power fails.
- **Maximum flexibility** – same unit can provide harmonic, decimonic and synchromonic applications.
- **Minimum maintenance** – only reliable trouble-free transistors are used.
- **Plug-in components** – no moving parts, no contacts to clean, adjust or replace.
- **Extremely stable** – takes varying room temperatures, humidities, load conditions in its stride.
- **Adjustable** – any combination of five or fewer frequencies can be provided.

Ask your Kellogg representative to give you full details on this easy way to modernize your central office.

KELLOGG Communications Division of ITT
CHICAGO, ILLINOIS

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Ill. Communications Division of International Telephone and Telegraph Corporation.

For complete list of offices see pages 6-7

USITA MANAGEMENT DEVELOPMENT COURSE

Continued from page 35

ters, the Independents will continue to be the beneficiaries of shifts in population away from the big cities. Mr. Barnhart also pointed out:

"W. M. Kiplinger, in his book 'Boom and Inflation Ahead,' visualizes within the next five years the start of the biggest boom the country has ever experienced. He sees the country by 1975 with a gross national product of 1,000 billion dollars a year as against 435 billion dollars in 1957. Within the next 10 or 15 years he looks for the biggest housing boom the country has ever had.

"If these predictions come true there will be countless millions of additional telephones in the country in 1975. There are 67 million now. Dynamic merchandising campaigns will contribute to the increase. . . .

"With people changing, management changing, technology changing and service changing, it would be unforgivable not to use every means in our power to improve our competence and at the same time our understanding of the world around us and our place in it.

"It seems inevitable that the need and demand for management talent will continue to increase. Managers must grow and it is they themselves who must do the growing. No one else can do it for them. Training and ever continuing education are essential.

"I am certain that you telephone men who are receiving certificates of achievement today have a better understanding of future places in the telephone world than you had before coming here."

Dr. James R. Surface, dean of Kansas University's School of Business and director of the program, congratulated the participants on completion of the course. He also congratulated the Independent telephone industry for its foresight in establishing the program. He said in part:

"In today's national preoccupation with science and technology, we are in danger of neglecting our great and growing need for capable management. By creation of this program, the Independent telephone industry has demonstrated its desire to develop to the fullest the industry's capacity to manage resources and personnel for the mutual benefit of the American people and the telephone industry."

Among the many guests present for the graduation ceremonies were several members and directors of the USITA and of several state telephone associations. Included were R. J. Fegan, of Junction City, Kan., and Kenneth L. Dally, of Lincoln, Neb., members of USITA's Personnel Committee, of which Mr. Fegan is chairman.

STI Completes First Year Of Telephone Technology

The Telephone Technology course at Southern Technical Institute, Chamblee, Ga., will enter its second year of operation in September 1959. (Southern Tech is a unit of the engineering extension division of Georgia Institute of Technology.) The first students in this program are at the present time finishing the basic electrical and electronics courses preparatory to taking the specialized telephone courses.

There are presently enrolled in this course students from 15 states. Some of the students are being sponsored by telephone companies. Others are attending under the telephone cooperative plan in which they attend school for three months and then work for three months, with one of the participating telephone companies.

The telephone technology course is taught by the department of electrical technology at Southern Tech. The students receive what the institute describes as a rigorous training in mathematics, physics, and the humanities, as

LOOK TO THE LEADER...

for
- RELIABILITY
- SERVICE
- NATIONALLY KNOWN TELEPHONE SUPPLIES

Prompt delivery of your order as specified is assured by Lindsay's fast, efficient, personalized service. Lindsay specializes in telephone supplies *only* . . . warehousing a complete line of the finest nationally known brands . . . your guarantee of the best as you want it . . . when you want it.

LOOK TO LINDSAY

THE LINDSAY TELEPHONE SUPPLY CO., *Est. 1939*
360 East Highland Road, Northfield, Ohio • Telephone: IMperial 7-7181

well as basic electrical and electronics subjects before they begin the specialty courses. These specialty courses include:

Outside plant.
Central office equipment.
Traffic.
Carrier systems.
Interference and protection.
Telephone systems technology.
Radio and microwaves.

Graduates of the course receive the Associate in Science in Electrical Technology, Telephone option.

Many operating companies in all sections of the United States have expressed great interest in these graduates, Southern Tech reports. Equipment manufacturers have also expressed a desire to acquire the services of some of these men.

Starting date for the fall quarter of 1959 is Sept. 21, 1959. Southern Tech stated that it was desirable that applications for this term be in before Sept. 1 to insure processing before the registration date.

For further information about this course, telephone or write to:

L. Y. Bryant, Registrar
Southern Technical Institute
Chamblee, Ga.

or

J. P. Goodwin Jr.
Head, Electrical Dept.
Southern Technical Institute
Chamblee, Ga.

USITA SPEAKERS

Continued from page 26

signments as Far Eastern correspondent for the *Monitor*, he made a grand journalistic tour of Asia.

Thoroughly acquainted with Europe also, he recorded on the spot many of the biggest news stories of the era, including Hitler's rise to power and the decline of the League of Nations. He is credited with many exclusives.

Arthur "Red" Motley, who will tie in his address on salesmanship with telephony's fast accelerating marketing and sales program, is a man who practices what he preaches.

For 45 of his 58 years he has been selling something to somebody. He has become recognized as a salesman's salesman. In fact, in 1954, he was named one of "America's Twelve Master Salesmen." He learned at an early age that even if you do "build a better mousetrap," you still have to let people know about it. In addition to supervising *Parade's* publishing activities, Mr. Motley travels an average of 100,000 air and rail miles each year to ad-

FORM 160
ALPHADUCT
SEMI-RIGID JUMPER WIRE
TESTED 5 WAYS FOR BUILT-IN QUALITY
DESIGNED All Alphaduct Semi-Rigid Jumper Wire for use as Jumper, Distributing Frame, and Cross Connecting wires, is insulated with a semi-rigid thermoplastic compound that just can't be beaten. Designed by Alphaduct specialists, this uniform high-grade plastic will not support combustion, is non-oxidizing, resistant to most oils and chemicals and is highly abrasion resistant.
GUARANTEED We guarantee it because Alphaduct rigorously tests these wires 5 ways for: compression • shrink back • heat shock • cold bend • flame resistance... to insure you products with that Alphaduct built-in quality.
SPECIFY When you specify Alphaduct Semi-Rigid Jumper Wire, or any one of Alphaduct's different types of telephone wire—you buy the know-how of the recognized leader in the manufacture of insulated wires for the Independent Telephone Industry.
ALPHADUCT
WIRE AND CABLE CO.
NEW BRUNSWICK, N. J.
CHarter 9-8090
National Distributors: Automatic Electric Sales Corp., Northlake, Ill. • Leich Sales Corp., 427 W. Randolph St., Chicago, Ill. Regional Distributors: Buckeye Telephone & Supply Co., Columbus, Ohio • The Lindsay Telephone Supply Co., Cleveland, Ohio • Pankey Supply Co., Charlottesville, Va.

dress between 100 and 125 different gatherings.

He is a director and vice president of the Chamber of Commerce of the United States and a member of the board of directors of the Advertising Federation of America.

In addition to this trio of personalities, other interesting, timely, instructive and worthwhile addresses will be made by leaders of the industry. Among the speakers will be President Hugh A. Barnhart and Executive Vice President Clyde S. Bailey.

There will be six technical conferences—REA Borrowers, Accounting, Commercial, Engineering, Plant and Traffic, opening with the REA Borrowers conference on Sunday afternoon, Oct. 11, which will be addressed by Administrator David A. Hamil of the REA.

Other conference speakers will include:

Walter G. Wright, vice president-operations, General Telephone & Electronics Corp., New York.

Paul Weiland, member of the Ohio Public Utilities Commission.

Frank S. Barnes Jr., Rock Hill, S. C.

C. K. Collins, assistant vice president, American Telephone & Telegraph Co., New York.

Frank Morris, Stromberg-Carlson Co., Rochester, N. Y.

Don Childers, United Utilities, Inc., Kansas City, Mo.

F. W. Hamper, operating vice president, General Telephone Co. of Ohio; and a host of others.

The advance copy of the still-uncompleted program indicates that the various conferences will be timely, topical, and informative.

A few of the subjects to be discussed are:

Budget Responsibilities of all Management Levels.

Adequate Audit Trials in Mechanized Accounting.

The Shape of Things To Come in Directory Publishing.

New Developments in Toll Credit Card Uses.

Transmission and Communication Improvement.

Number Service Planning.

Telephone Research and Development.

Cable Pressurization Methods.

The What and Why of Traffic Engineering.

Customer Relations in the Traffic Department.

The usual social and entertainment features will be offered. The annual banquet scheduled for Tuesday night, Oct. 13 in the Grand Ballroom of the Conrad Hilton and the Independent Telephone Pioneer Association's meeting, which will feature the Illinois Bell Chorus, will be highlights of the convention.

The two floors of extensive exhibits by the industry's manufacturers and suppliers will present some of the most interesting and worthwhile features of the 1959 convention.

USITA officials say it looks like a grand convention, and those who have not already done so will do well to make hotel and travel reservations promptly.

NEW! from **S&G**

THE MODEL "R" DEHYDRATOR

AUTOMATIC IN OPERATION

The Model "R" Dehydrator is designed to supply dry air to aerial and underground telephone cables. It is especially suited for small installations of 80 miles or less of cable. Wall or relay rack-mounted, the Model "R" is approximately 24" high, 28" wide and 8" deep. Operating voltage is 115 volts, 1 phase, 60 cycle, and the output is 700 standard cubic feet per day maximum, with a dewpoint of —65°F. Other outstanding features are:

- Hi-Lo pressure switch for alarm
- Humistat for alarm above 4% Relative Humidity.
- Power failure relays and separate fustat
- By-Pass Valve & Alarm for excessive Relative Humidity.
- Mechanical control valve for stand-by air supply (O.P.N.) in event of power failure
- Additional safety features on Air Compressor
- Power supply is 115-volt, AC on the Dehydrator and Air Compressor

for further information, phone or write:

S & G MANUFACTURING CORPORATION

P. O. Box 1309 • New Orleans 10, La. • JAckson 5-3142

IMPACT OF TELEPHONE

Continued from page 22

Type of Industry	*Percentage Distribution*
Total Employment	100.0
Mining	3.2
Contract construction	6.9
Manufacturing	17.2
Transportation and other public utilities	10.7
Trade	25.9
Finance, insurance and real estate	3.3
Service & misc.	13.8
Government	19.0

Wyoming

The per capita income was 1,875 dollars in 1956 and 585 dollars in 1939, an increase of 220.5 per cent. In millions, the population was 0.3 in 1956 and 0.2 in 1939, an increase of 21.9 per cent; there were nearly 0.1 households in 1956 and this represented an increase of 34.2 per cent since 1939.

There were 0.1 million telephones in 1956 with 31.8 per cent for business and with 37.8 per cent for business in 1939. The increase in totals was 200.2 per cent.

In thousands there were 0.3 manufacturing establishments in 1939 and 0.1 in 1900; employment was 7.0 in 1956; 4.4 in 1939; and 2.1 in 1900.

In millions of dollars, payrolls were 30.0 in 1956; 6.6 in 1939; and 1.3 in 1900. Value added by manufacturing was 61.0 in 1956; 15.3 in 1939; 1.8 in 1900.

In thousands, 1958, there were 112.7 telephones with 35.4 for business and 77.3 for home use.

The personal income in 1957 was 644 million dollars.

Employment in 1958 was distributed as follows:

Type of Industry	*Percentage Distribution*
Total Employment	100.0
Mining	9.0
Contract construction	8.8
Manufacturing	7.6
Transportation and other public utilities	14.8
Trade	22.0
Finance, insurance and real estate	2.6
Service and misc.	13.0
Government	22.2

Colorado

The per capita income in 1956 was 1,863 dollars and in 1939, 516 dollars, an increase of 261.0 per cent. In millions, the population was 1.5 in 1956 and 1.1 in 1939, an increase of 37.9 per cent; there were 0.4 households in 1956 and 0.3 in 1939, and this was a gain of 51.7 per cent.

There were, in millions, 0.6 telephones in 1956 and 0.2 in 1939, a gain of 184.2 per cent. Business accounted for 31.9 per cent of telephones in 1956 and 36.1 per cent in 1939.

There were, in thousands, 1.2 manufacturing establishments in 1939 and 1.3 in 1900; employment in 1956 was 74.0; 32.2 in 1939; and 21.3 in 1900.

In millions of dollars payrolls were 327.0 in 1956; 43.9 in 1939; and 13.7 in 1900. Value added by manufacturing in 1956 was 643.0; in 1939, 90.3; in 1900, 28.3.

In 1958, in thousands, there were 654.9 telephones with 206.9 for business and 448.0 for home use.

The personal income in 1957 was 3,339 million dollars.

Employment followed the pattern in 1958 shown below:

Type of Industry	*Percentage Distribution*
Total Employment	100.0
Mining	3.4
Contract construction	6.9
Manufacturing	15.5
Transportation and other public utilities	9.7
Trade	26.0
Finance, insurance, real estate	4.7
Service and misc.	13.3
Government	20.5

Utah

In 1956 the per capita income was 1,633 dollars and in 1939 it was 462 dollars, an increase of 253.4 per cent. In millions the population was 0.7 in 1956 and 0.5 in 1939, an increase of 42.0 per cent; households in 1956 were 0.2 and 0.1 in 1939, a gain of 61.4 per cent.

Also in millions there were 0.2 telephones in 1956 and this represented a gain of 256.4 per cent. Business accounted for 28.3 per cent of total tele-

CONDEX MULTIPLE CONCRETE CONDUIT

SPOTTING OF CONDUIT ALONG RIGHT-OF-WAY ADJACENT TO PROPOSED TRENCH

NOW AVAILABLE IN ALL THESE SIZES: 2, 4, 6, 8 and 9 DUCT

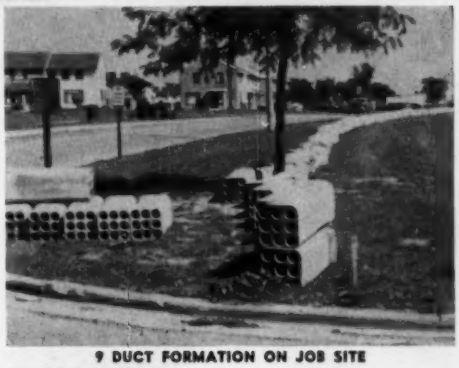
Special fittings—miters—short lengths—expanded web sections available, also adapters to claytile, transite and fiber duct.

CONVENIENT

Delivery can be made to jobsite on 24 hours notice. Condex may be installed in any weather, even in trenches holding water. Ditches can be covered as soon as installation is made. Due to low breakage factor, jobs can be estimated more accurately.

STRONG

Pittsburgh Testing Laboratory tests show: compressing strengths of 10,000 lbs. PSI; water absorption of 3.9%; load test-failure at 74,000 lbs. From a telephone company report on Condex multiple-duct concrete conduit—"it is obvious that no trouble was experienced in cable placing operations, no evidence of excessive abrasion on the lead sheath." Smooth bore is obtained by mechanical honing.



9 DUCT FORMATION ON JOB SITE

ECONOMICAL

Multiple-Duct Concrete Conduit is manufactured with a bell-end joint, eliminating the use of plastic or mortar bandages with dowel pins, for joining. A joint sealing compound, applied with a pressure gun, is all that is needed and cost of this joining operation is less than 3½c per trench foot for both material and labor.
Single crews have installed 1,600 to 1,800 trench feet of conduit per 8 hour day, with two to three less men than with other types which require mortar bandage joints.
Breakage factor of concrete conduit is less than 1%, due to strength of product.

FOR FULL INFORMATION—CALL OR WRITE YOUR LOCAL LICENSEE, OR THE PARENT COMPANY

CONCRETE CONDUIT CORP.
130-01 Northern Boulevard
Corona, New York
Illinois 7-1515

CHICAGO PRE-CAST PRODUCTS CORP.
9400 West Belmont Avenue
Franklin Park, Illinois
Gladstone 5-8116

UTAH CONCRETE PIPE CO.
379—17th Street
Ogden, Utah
Export 2-7513

ELMORE CONCRETE PRODUCTS CO.
Div. of North Star Concrete Co.
Elmore, Minnesota
Elmore 52

EMPIRE CONDEX, INC.
6700 Mad River Road
Dayton, Ohio
Tuxedo 5-7051

WESTERN CONCRETE PIPE CO.
3501 Power Inn Road
Sacramento 19, California
Hunter 6-0026

T. E. L. PRE-CAST PRODUCTS CORP.
1 Industrial Avenue
New Smyrna,
Edgewater, Fla.
Gardon 8-9881

J. E. EVANS CONCRETE PRODUCTS CO., INC.
Shelbyville, Indiana
Express 8-9734

AMERICAN CONCRETE PIPE CO.
(Sub. of Amer. Pipe & Construction Co.)
2025 So. 7th Street
Phoenix, Arizona
AL 2-7566

PRE-CON LTD.
Orenda Road
Brampton, Ontario
Canada
BU 6-3042

CONDEX
GAGNE ENTERPRISES, INC.
9400 WEST BELMONT AVENUE
FRANKLIN PARK, ILLINOIS
GLadstone 5-8116 or 6831

phones in 1956 and 35.6 per cent in 1939.

There were, in thousands, 0.5 manufacturing establishments in 1939 and about the same number in 1900; employment ran as follows: 1956, 33.0; 1939, 15.5; 1900, 6.0.

In millions of dollars payrolls were 152.0 in 1956; 18.9 in 1939; 3.2 in 1900; value added by manufacturing was 430.0 in 1956; 43.3 in 1939; and 6.5 in 1900.

In 1958, and in thousands, there were 304.2 telephones with 84.5 for business and 219.7 for residences.

Personal income was 1,442 million dollars in 1957.

The employment distribution in 1958 is as follows:

Type of Industry	*Percentage Distribution*
Total Employment	100.0
Mining	6.7
Contract construction	6.5
Manufacturing	15.4
Transportation and other public utilities	9.4
Trade	23.8
Finance, insurance and real estate	4.1
Service and misc.	11.4
Government	23.7

(To Be Continued)

THE P.U.R. GUIDE

Concluded from page 19

along these lines without sound guidance.

It would have been easier for the publishers to telescope all of these texts, charts, and materials, and even the examination questionnaires, between the covers of a bound volume to be sold indiscriminately.

But, that would have defeated the purpose implied in the name *"Guide."* The program is, in truth, a "journey of understanding," but one which requires a guide on hand throughout the entire trip.

Moreover, it is one that must be taken in carefully prepared stages, with progress regularly marked, if the goal of a better understanding of public utility operations and regulation is to be attained by the company employe.

The publishers have endeavored to do exactly that in working out a systematically controlled year's program, comparable to college training, which can be had for a fraction of a week's salary of the average employe taking it.

MEMORANDUM
TO: Company Managers
When you buy rebuilt products,
buy them where they were made!
For rebuilt TELEPHONES
SPRING JACKS
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CUT-OFF RELAYS
CORD CIRCUIT EQUIPMENT
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These dependable Kellogg products have all been rebuilt with original factory parts, with the same service and inspection used on new equipment.
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Communications Division of
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Merchandising Seminar Set By Wisconsin Association

The Wisconsin State Telephone Association has announced that a telephone merchandising seminar, which it is sponsoring, will be conducted by the University of Wisconsin's Management Institute at the university on Sept. 16 and 17.

The value of this seminar is set forth by the association in its announcement as follows:

"The value of merchandising in the telephone industry has been well proven in marketing efforts extended by the larger companies and now for the first time, tips on the philosophy, psychology and need for merchandising will be available to all companies of the state.

"The two days will be literally 'packed' with schooling and no time for revelry.

"Discussion leaders have been selected from some of the top talent of the country."

Obituaries

JOHN E. OSTLINE, 73, an international figure in the telephone industry since 1905, and the developer of automatic toll ticketing equipment, died on July 31.

Mr. Ostline, who retired from General Telephone Laboratories in January, 1958, came to this country from Sweden in 1905 and started his telephone career as a combination lineman, installer and maintenance man for an Independent company in Minnesota.

He worked in a variety of engineering positions with Independent and Bell exchanges in the Northwest during the next several years.

In 1922, he joined Automatic Electric Co. after holding a position as assistant chief traffic engineer of Tri-State Telephone Co., which had offices in St. Paul, Minn.

In 1923, Automatic sent him to London, England, where during the next six years, he assisted in converting the world's largest city to automatic operation.

While in London, he designed the coder call indicator system for that conversion and also worked on the design of the director equipment.

Also during 1923, Ostline began work on the foremost achievement of his career—the development of automatic toll ticketing equipment. The invention, finished two years later, was patented in 1928. This and following contributions led to the commercial system known today as SATT.

The ticketing equipment was one of the first of a record number of inventions leading to commercial use. In ad-

dition to holding nearly 100 U. S. patents, he held patents and applications for 367 devices in England, Italy, and Belgium.

During the remainder of his career, Mr. Ostline was credited with the development of an automatic toll ticketing system at Mons, Belgium; design of the first Independent commercial application of SATT in this country; development and design of additional new automatic toll ticketing systems for use in nationwide Direct Distance Dialing; plus scores of other accomplishments.

In 1947, Mr. Ostline received Automatic Electric's highest honor, the Talbot G. Martin award, presented for outstanding achievement in the art of communications.

Ostline was a fellow of the American Institute of Electrical Engineers, a "chartered E. E." in Great Britain, and a member of the Institution of Electrical Engineers (England).

Survivors include his wife, Mattie.

•

EARL WILLIAM CASHMAN, 68, former director and vice president in charge of operations for Graybar Electric Co., Inc. died on Aug. 3.

Serving the company for 42 years, Mr. Cashman originated major policy changes which helped to realize his ideal of improved customer service.

Mr. Cashman's Graybar career started in the Minneapolis accounting department in 1912.

In 1916, having spent four years learning accounting routines of the company, he was assigned to the service department, where his responsibilities were equivalent to those of an office salesman today.

In 1921 he was made head of the service department at Minneapolis and he held the same job in larger districts.

In 1939 he went to the general department in New York as general service manager of the company.

In 1941, he was elected to the board of directors. His election as vice president in charge of operations became effective in 1952, the position held until his retirement in 1955.

Mr. Cashman served as a member of the executive committee of the board of directors.

Surviving are his wife, Mrs. Emeline Cashman; his mother, Mrs. Jeanette Cashman; and four sisters, Mrs. Mary F. Johnson, Mrs. Margaret Bennett, Mrs. Verna McLaughlin, and Mrs. Vera Frantz.

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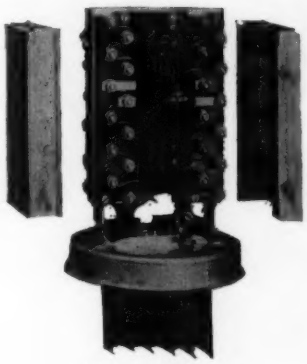
CEECO PARKWAY LUG TYPE PEDESTAL TERMINALS FOR DIRECT BURIED WIRE OR PLASTIC CABLE

★ PEDESTALS—TWO PIECE—SIX FEET LONG
★ POLE BRACKETS—AVAILABLE FOR AERIAL MOUNTING
★ LOADING ONE OR MORE PAIRS AS REQUIRED—USING TYPE C637A (88MH) OR TYPE C637B(44MH) COILS



LUG-12 TERMINAL AND PROTECTOR PLATES WITH SEVEN TYPE 637B LOADING COILS

TYPE CH-15 "BELL JAR" HOOD

★ ACCESSIBLE—FOR TESTING, CABLE SPLICING, CROSS CONNECTING AND BURIED WIRE DISTRIBUTION
★ STRONG—ALL STEEL CONSTRUCTION, "BELL JAR" TYPE COVER
★ PROTECTION—SIDE PLATES GIVE NOMINAL AIR GAP TYPE PROTECTION AT EACH STUD END
★ COMPLETE—WITH NON-PROTECTED TERMINAL STRIPS, DECALS, ETC. NO EXTRAS

The type C637A(88MH) or C637B(44MH) load coils are completely encapsulated in plastic—moisture tight—high dielectric strength. These coils are same type used in CEECO type 177 terminals on rural distribution wire. These coils are interchangeable in both terminals and can be installed with standard 3/8" socket wrench. Coils are stock item.

CATALOG NUMBER	DESCRIPTION	TOTAL NUMBER PAIRS HIGH	TOTAL NUMBER COILS	INSIDE HOOD DIAMETER	APPROXIMATE HEIGHT OF HOOD
LUG-12	TERMINAL-PEDESTAL AND HOOD (NO COILS)	6	12	6 ID	15"
LUG-16	TERMINAL-PEDESTAL AND HOOD (NO COILS)	8	16	6 ID	15"
LUG-28	TERMINAL-PEDESTAL AND HOOD (NO COILS)	14	28	6 ID	21½"
LUG-52	TERMINAL-PEDESTAL AND HOOD (NO COILS)	26	52	6 ID	32½"

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3/8″

7/16″

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News on New Products

INSULATING MATERIAL — A new concept in the field of insulation material, "HYRAD-FR," is announced by the Sequoia Wire & Cable Co., a subsidiary of the Anaconda Wire & Cable Co. "Hyrad-FR," developed by Sequoia, is said to retain the excellent electrical properties of polyethylene, but has greatly improved heat stability and cold flow resistance—plus flame retardance.

Electron streams bombarding an insulated wire cause a cross-linking of the polyethylene molecules. This changes the plastic from a two-dimensional molecule, which is a thermally sensitive thermoplastic to a three-dimensional thermally stable thermosetting configuration.

One of the outstanding features of "Hyrad-FR" is its reported ability to withstand a soldering operation without being damaged. This is very important. It permits a circuit designer to take advantage of an insulation with good electrical properties equal to polyethylene but capable of going through soldering operations for assembly.

The flame retardant characteristic of "Hyrad-FR" is unique and Sequoia says it is recommended whenever flame exposure is an important consideration. Request NP1169.

•

LINE CONSTRUCTION BODY— Donald H. Groft, sales manager for the York-Hoover Corp., has announced the addition of a new "Bobcat" line construction body series to the company's line of public utility truck bodies.

According to Mr. Groft, the "Bobcat" series was developed as a result of the demand for more stability in the line construction truck when heavy loads are being handled by the derrick.

In the past, it has been necessary to use derrick support jacks to keep the truck from tipping under the load of heavy poles. When these jacks are used, the vehicle is immobilized and cannot be moved without serious damage to the support jacks.

In the "Bobcat" series, he explained, the rear overhang of the body has been reduced to get the pivot point of the derrick closer to the rear wheels of the truck and thus to get the center line of the load also closer to the rear wheels. The distance from the center line of the rear axle to the rear of the body is only 26 inches on this unit.

This short distance makes a tail shelf on the back of the body mandatory in order to cover the rear spring hanger of the chassis. Much larger poles can thus be handled with this unit without

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Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1169_____; NP1170_____; NP1171_____; NP1172_____;

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8/29/59

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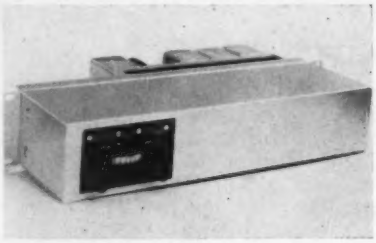
the use of immobilizing derrick support jacks, Mr. Groft stated.

The new bob-tailed vehicle is combined with other York-Hoover design features, which results in a rugged, durable and lightweight construction body, Mr. Groft summarized. Request NP1170.

•

GAIN ADJUSTING AMPLIFIER PANEL—Lenkurt Electric Co.'s compact new automatic gain adjusting amplifier (AGAMP) panel, originally developed for Mobiltel manual and automatic mobile telephone systems, is reported to be available for use on any voice circuit to maintain a constant voice level over a 40-db input level range.



The AGAMP's speech amplifying and associated regulating circuitry is packaged in a panel occupying two vertical spaces (3½ inches) in a standard 19-inch equipment rack. It projects 5¾ inch from the face of the rack.

Reacting to syllabic speech, the AGAMP, according to Lenkurt, does not clip excess-volume speech, but shifts the entire range to Zero VU to avoid distortion. With no signal input it rests at normal gain. It does not regulate for random noise or sine-wave inputs.

The input range, normally set from —54 to —14 VU, can be attenuated to a maximum loss of 20 db in 4-db increments through a switch on the front of the panel, the company says. Output volume is Zero VU ± 4 VU. Frequency range is 300 to 3,000 cps. Also on the front is a meter which displays dc voltages of four separate functions as selected by a switch.

All circuits are transistorized and are contained in three plug-in etched-wiring boards which slide out from the front for inspection and maintenance. The AGAMP operates on 48v. Request NP 1171.

•

POWER-INSTALLED SCREW ANCHORS—A new line of power-installed screw anchors is offered by the A. B. Chance Co. These anchors are designed to be installed with the power hole-

diggers used by utilities for line construction.

These power-installed screw anchors, the company says, average only 5 to 8 minutes for complete installation, and

they can be installed in all types of soil except in extremely rocky areas.

These anchors are adapted to power equipment by means of a special installing wrench. (This wrench does not come with the anchors; but is purchased separately from the Chance company.) The wrench fits over the anchor and carries the installation torque. It attaches to the hole-digger's drive shaft with the auger head removed. Or by means of an adapter, available from other manufacturers, it attaches to the un-removed auger head. The wrench is easily removed for reuse.

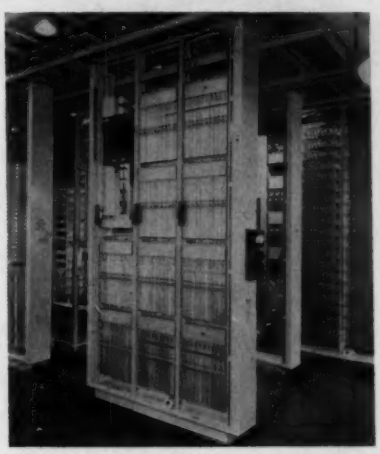
Each power-installed screw anchor consists of a galvanized-steel threaded rod screwed into the shank of a steel anchor helix. Both top and bottom of the helix are welded to the hub of the anchor by shielded-arc electric weld. Either thimbleye or twineye guy-wire nuts are available, the company states. Request NP1172.

•

TRANSISTORIZED CABLE CARRIER—Panhandle Electric Sales, Inc. reports it is commemorating its 10th anniversary in the carrier field by offering type "X" 100 per cent transistorized four-wire cable carrier on a direct distribution and engineering assistance basis.

This system is said to represent the results of 2½ years of research, development, and field trials. It is designed for use on mixed gauge interoffice trunk cable. Repeaters are automatic balancing and are powered by a series-simplex arrangement over the cable pair. Signal units to accommodate the majority of interoffice trunk requirements are available.

Pictured are 100 channel terminals installed in the Whitehall exchange, Dallas, Tex., and providing multi-office tandem service. The office is handling various types of loop trunks and several battery pulsing, battery seizure, and battery supervision 2400 ohm



trunks. No outgoing or incoming trunk repeaters are employed in the office shown. This installation, according to

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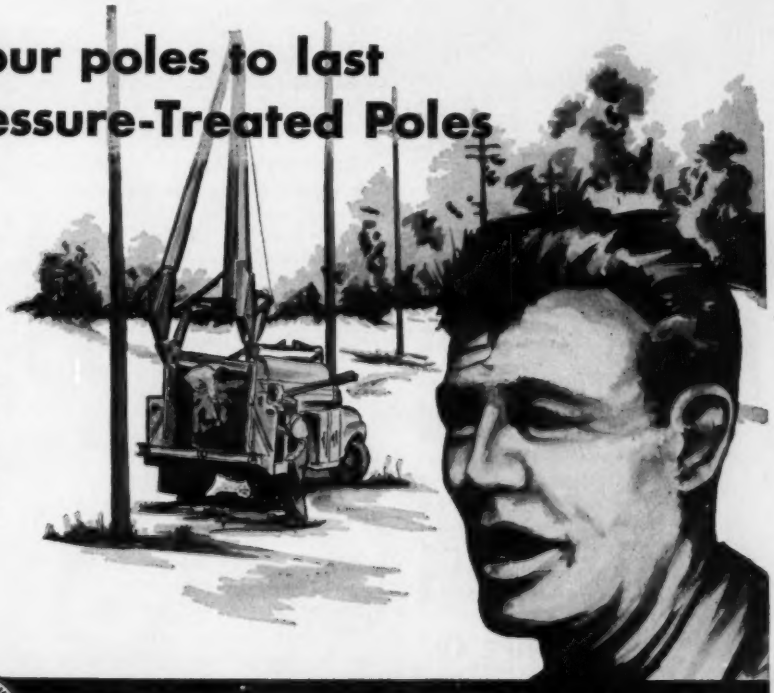
Every pole bearing the T-C brand has received the best in preservation. "The T-C Treatment" makes them last, and give you generations of trouble-free service. Our pressure treating process (and we think you'll agree) is the best yet developed by modern Technology . . . and, only the best chemical preservatives are used. That's why we can say—Specify T-C and get the best in preservation.



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Panhandle, works directly from outgoing selector levels and to incoming selectors, thus allowing an equipment saving.

Panhandle says its transistorized "X" carrier system:

Provides 20 two-way voice channels with signaling from two pairs of a single or mixed gauge cable which may have as much as 240 db of attenuation at 336 kc.

Incorporates angular modulation with its reported advantages of am noise rejection, capture, inherent self-regulation and high signal-to-noise ratio.

Has a new basic repeater design that provides 20 db gain, preserves cable pair continuity, automatically balances the cable pair and allows use of mixed gauges of cable.

Features Universal repeater housing of stainless steel providing for pole, strand, or manhole mounting on pressurized or unpressurized cable systems.

Offers self-contained mercury-cell-powered meters.

Has all components mounted on glass phenolic boards using a new lock and solder technique which, the company states, makes for trouble-free service.

Request NP1173.

•

THIMBLE CLEVIS—A simplified, efficient method of making corner or dead-end conductor attachments is said to be provided by Hubbard & Co.'s. No. 674 open-side thimble clevis. The conductor is simply looped around the wire groove eliminating the need for threading through the clevis.

The deep groove, which makes almost a complete circle is reported to assure a secure grip. It is also very smooth to prevent chafing of the conductor. The thimble is 2¼ inches in diameter and will accommodate strand or wire ¾ inch or under. Request NP1174.

DEHUMIDIFYING HEATER—Communication equipment is seriously affected not only by the excessive dampness found in warm, humid climates, but by condensation due to temperature changes in practically all climates.

Dangers from the use of highly concentrated sources of heat to correct dampness and condensation conditions are recognized by every communications engineer.

There has been a long-standing need for a special device to meet the following exacting requirements:

(1) The heating element must be long enough to distribute the heat evenly throughout the equipment to be protected, thus avoiding the danger of overheating some parts and underheating others.

(2) It must be designed to withstand voltage surges to which all electrical equipment is subjected when it must operate 24 hours every day.

(3) Its wattage must be 4 to 6 watts per cubic foot due to equipment being vented.

(4) The heater must not be a personal hazard, even when it is in direct contact with components or wiring.

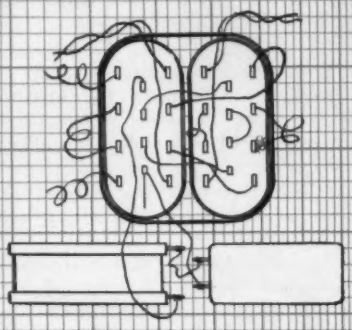
The new Thermo-Electric dehumidifying heater, manufactured by Dampp-Chaser, Inc., is said to meet these exacting requirements. It will stop leakage and corrosion in all PBX, unattended CDO's and central office equipment.

Unlike hot spot heaters that concentrate heat in one spot with a dangerously high 250° surface temperature, the Dampp Chaser is claimed to evenly distribute the heat over its entire length at a safe surface temperature of only about 150°. This is shown in the accompanying illustration where all nine fans are rotating due to Dampp-Chaser's dehumidified circulation of air.

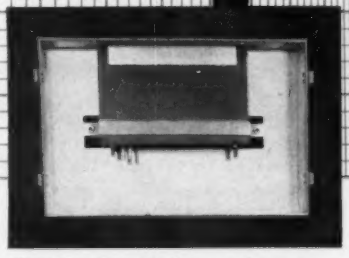
Many communications engineers do not fully realize that by keeping equipment only 2 or 3 degrees warmer than the room temperature at all times, condensation resulting from daily temperature changes can be completely eliminated.

Moisture cannot condense on surfaces unless they are at least a fraction of a degree cooler than the air around them. Keeping away condensation may be easily and efficiently accomplished by using continuous, gentle, well-dis-

Acceptance tests are simpler, quicker with Airtronics PORTABLE Test Hybrid



NO MORE OF THIS



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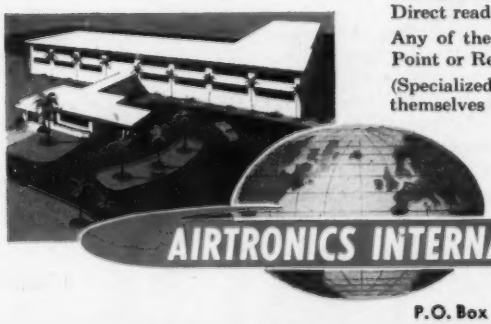

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(Specialized applications will suggest themselves to you.)

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128 type low pass filter.
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Internal switching provided for two most commonly used networks.
Plug-in network arrangement, compromise net built in.
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Convenient panel lay-out, jacks and binding posts to facilitate connection to line or external circuits.
600 ohm impedance on 4 wire legs.
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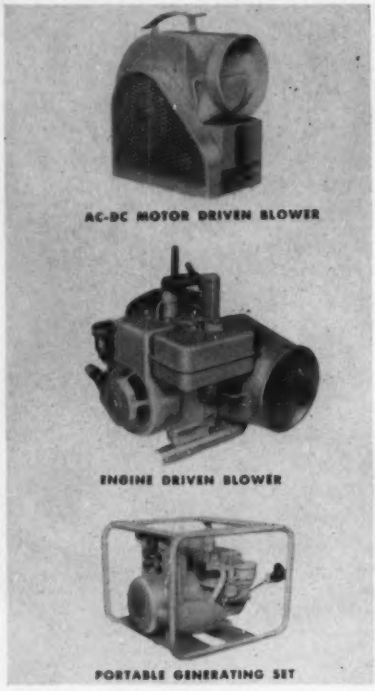
tributed heat. A 25-watt Thermo-Electric heater unit consumes only 18 kwh per month which is reported to average a penny a day. Request NP1175.

•

POWER AND BLOWER UNITS—New, lightweight portable power and blower units have been announced by United States Motors Corp. for a wide variety of on-the-spot electric power applications, ventilation needs, and exhausting purposes.



AC-DC MOTOR DRIVEN BLOWER

ENGINE DRIVEN BLOWER

PORTABLE GENERATING SET

The units are designed primarily for use by telephone systems, public utilities, municipalities—anywhere portable services of this type can be used.

The generating sets are said to provide a dependable source of electric power for lights, portable tools and other electrically driven equipment. The sets are lightweight and air-cooled.

The generators, which meet AIEE and NEMA standards, are available in two sizes—1250 watts, 115 volt ac, and 1350 watts, 125 volt dc.

Each is compact, weighing less than 100 pounds, and can be carried in the field by one person.

Designed for use at manholes, for fire-fighting, remote construction and maintenance areas, the generating sets are reported to be complete with generator panel, residential exhaust silencer, two duplex grounded receptacles, voltmeter and pilot light.

The units are supported and enclosed by a tubular frame for protection and ease in handling.

Two types of blowers are also offered in the new, portable equipment. These are an engine-driven blower and an ac-dc motor-driven blower.

They are claimed to be especially well suited for supplying fresh air to manholes and sewers; for ejecting smoke, fumes, stale and contaminated air; and for purging tank cars, or field storage tanks.

Each blower type has a rated capacity of 800 cubic feet of air per minute.

The motor-driven blower operates from either an ac or dc electrical supply of 115 volts, and United States Motors says it can be used with its portable generating set to make the blower a convenient, movable tool weighing only 29 pounds.

Features of the new engine-driven blower include a provision for two governed speeds and an adjustable discharge damper.

An 8-inch diameter, 15-foot long suction-discharge hose for use with either blower type is available as an optional accessory. Request NP 1176.

•

STANDBY POWER UNITS—Also from United States Motors is a new line of versatile mobile power supply units with generators that deliver three phase or single phase ac. The units are used in an emergency standby capacity to normal power sources.

The portable units are called "versa-trailers."

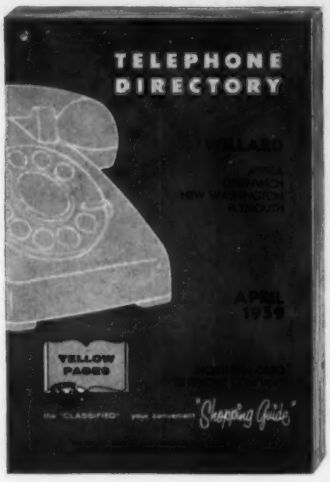
Said to be valuable for use in communications systems, the engine generator package is available in three sizes—15 kw, 25 kw and 35 kw, three phase, 80 per cent pf. Each has a corresponding single phase rating.

Three phase voltages are 240, 3-wire, and 120/208, 4-wire. Single phase voltages are 120 or 240 volt, 2-wire, and 120/240 volt, 3-wire.

Selection of the desired voltage is made instantly, the company says, through a connection box with interchangeable covers, one cover for each voltage. The covers are connected to cables that terminate in plugs. Each plug is different—designed to fit only the proper receptacle.

Engines of the mobile units are described as liquid-cooled, gasoline, 1800 rpm with quiet, residential-type muffler and weatherproof house with fuel tank.

All equipment is mounted on a flat-bed, two-wheel trailer said to be built for rugged, high speed mobility. Trailers have fenders, parking jack, dead stand, safety chains, stop and tail lights, directional lights, lunette hitch, and fuel tank.



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An INTRODUCTION to SEMICONDUCTORS

By W. CRAWFORD DUNLAP, Jr. Offers a survey of *all* the important aspects of semiconductors—from research to devices. Covers fundamental concepts, properties of materials, methods of measurement, and applications from a unified point of view. The treatment is almost entirely physical, the emphasis being on mechanisms and devices. It gives full coverage of germanium and silicon and discusses the properties of many other semiconducting elements and compounds. *1957. 417 pages. $11.75.*

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Model TBM Service Entrance Mast provides complete service entrance facilities for outdoor telephone booths with the definite plus advantages of lower cost and easier installation. Raises power lines for specified ground clearance. Looks better, lasts longer, costs less than any comparable installation.

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Combination warning flasher and flood light on extendible stand, and either electric or tension safety brakes are optional equipment on the trailers. Request NP1177.

ABC OF TELEPHONE

Continued from page 21

wire line. However, the end result of vibration is the weakening and breaking of the line wire where it is tied at insulators and, occasionally, at splices.

Line wire vibration is, basically, a result of short wave length oscillation. upsets the tuned characteristics of the span and the travelling waves are stopped before they can build up the higher frequencies that result in vibration.

Vibration dampers function in several different ways. Some dampers, as illustrated in *Fig. 3*, are similar to a length of plastic tree guard used to protect drop wires that must be extended through a tree. Several of these dampers are wrapped on the span and are relatively free to move along the span. In actual practice they probably do not move more than a few inches over a period of years.

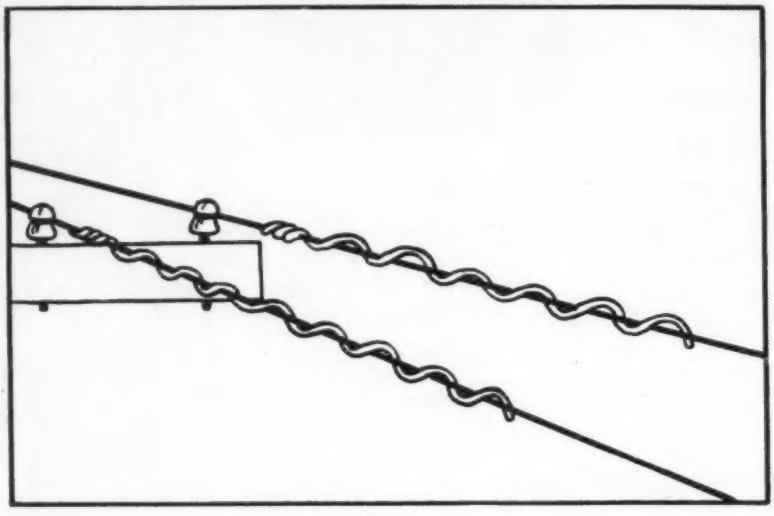

Fig. 4

If the oscillations or travelling waves along the line are arrested or stopped, the vibration will stop.

An effective way to stop vibration is to place a vibration damper 2 or 3 feet from each end of a span. The damper

Even though a number of these dampers may be placed on a span, they are not placed with an attempt at maintaining an exact or precise spacing. A random spacing will control vibration much more effectively.

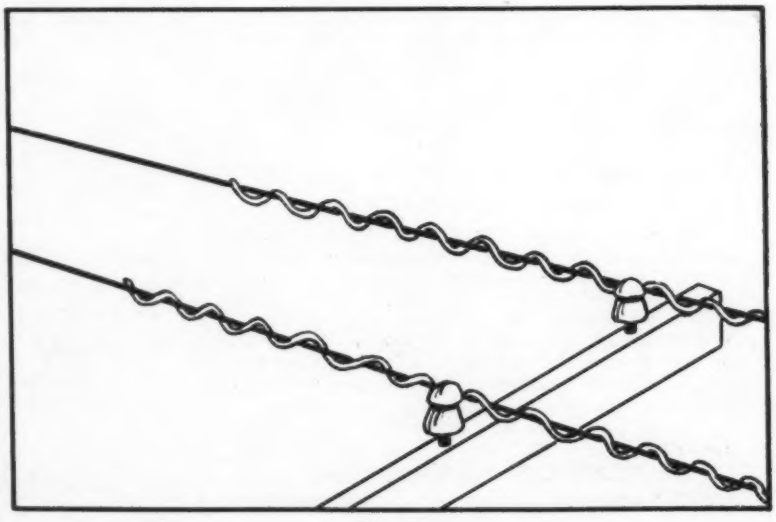

Fig. 5

In a previous article in this series—Part 41, Attenuation and Coil Theory Loading—a mechanical analogy of weighting a string was used to demonstrate why loading coils must be placed at precise intervals. A statement was made in the article that if the loading coils were properly located, an electrical wave would travel along the line as if the line had neither capacitance nor loading. This was demonstrated by the analogy of placing weights on a string and then attempting to pass a wave of motion along the string.

If the weights were placed at random intervals the waves died out before they travelled from one end to the other. If small weights were evenly spaced, a wave would travel from one end to the other and, in many cases, would travel back along the line. The same conditions hold true on an open wire line.

Dampers placed at random intervals control the vibration waves. Dampers evenly spaced have practically no control over the rate of vibration.

A second type of vibration damper, see *Fig. 4*, not only inserts a heavier point along the span, but also provides a secondary balance to dissipate the vibration. This damper is also made of plastic. A short spiral or helix, formed in one end, is used to fasten the damper to the wire. The rest of the damper is formed in a larger helix to an over-all length of 18 to 24 inches. The free end is wrapped around but does not contact the wire. This adds another dimension to help control vibration.

A vibration wave moving along the span strikes the inertial force provided by the weight of the damper attached to the line. This alone provides substantial vibration control. The rebound of the wave, travelling along the free moving end of the damper, is effectively dissipated.

Another spiral-type damper, shown in *Fig. 5*, is made of insulated copper wire. The damper, formed into a helix at the factory, is wrapped on to the wire. Generally, the inside of the helix at approximately the center of the damper is placed against the line wire. Then the free ends of the damper are wrapped onto the wire.

A substantial degree of vibration control on long spans is provided by using spacer units at intervals along the span. As discussed previously, the spacers make the longer span look the same as shorter spans. Since there is relatively little vibration in shorter open wire spans, the spacer units are also valuable as vibration control units.

While on the subject of vibration—consideration should be given to how

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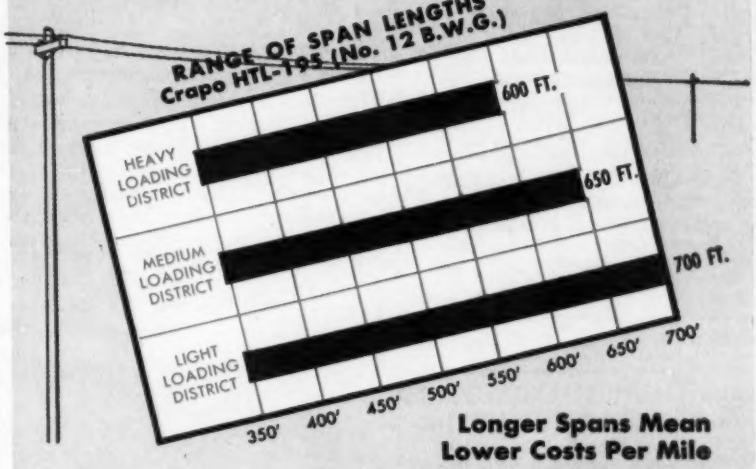

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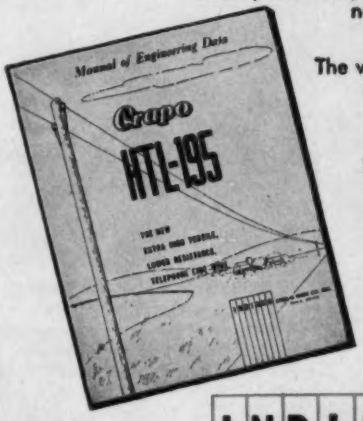

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the tie at the insulator affects vibration. Some tie wires hold the line wire quite rigidly to the insulator. This has a tendency to abruptly stop a travelling vibration wave.

Other types of tie wires more or less cradle the wire at the insulator. This holds the wire securely but allows all or most of the vibration wave to pass by the tie point. As a result, the undesirable effects of vibration are substantially eliminated.

As mentioned previously, there are many instances where open wire lines are the most economical type of outside plant. This is especially true because of the new developments and new techniques that have been introduced. Perhaps most interesting is the lesson in progress that this teaches.

Sometimes progress may be the introduction or use of a completely new idea. However, in many instances progress is measured by small improvements in older methods or techniques.

Open wire lines, by these standards of measurement, have kept pace with other developments in the telephone industry. That's why new open wire lines —used where they are economically advantageous—are as modern as the newest dial central office or direct distance dialing system.

(To Be Continued)

C & D Batteries, Conshohocken, Pa., has announced that Clayton H. McClinch is now associated with the company as a sales representative with Packaged Industrial Power, Inc., C & D representative, at Jersey City, N. J. Mr. McClinch, who was formerly with the Bullard Machine Co. and Flicks Electric Service, received his technical training at the Bridgeport Engineering Institute and the Hemphill Diesel School in Long Island.

F. E. Leib Vice President Copperweld Wire & Cable

James M. Darbaker, president of Copperweld Steel Co., has announced the promotion of F. E. Leib to vice president in charge of the Wire and Cable Division, Glassport, Pa.

F. E. LEIB

Prior to his new assignment, Mr. Leib was general manager of sales of the Wire and Cable division. Before that, he was chief electrical engineer.

He also served as assistant manager of sales, and for several years, was Copperweld's representative in Washington, D. C.

Mr. Leib, who in 1926 graduated from the University of Illinois with a B. S. degree in electrical engineering, has been active in the electric power and communication field for the past 33 years.

United Utilities Shows Income Rise First 6 Mos.

United Utilities, Inc. reported consolidated net income in the first half of 1959 as $2,251,610, up 28.5 per cent from the $1,752,637 reported for the same period in 1958.

On the average number of common shares outstanding during the respective periods, the first half of 1959 earnings were equivalent to 98.4 cents per share as compared to 79.6 cents per share in 1958.

Gross operating revenues for the six months ended June 30 totaled $20,548,-631 as compared with $18,411,787 for the first half of 1958.

The United System gained 9,032 telephones during the first half of 1959 and converted 21 exchanges serving 44,023 stations to automatic operation.

Total telephones in service on June 30 were 460,335.

MDF PROTECTION

Western Electric (fully equipped)
#C 50 A, 50 pr. group, new . . . $40.
reconditioned . . . . . 25.
C 52 A, 52 pr., new . . . . . 42.
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C 25 A, 25 pr. (1/2 of C50), new 20.
1268 A, 20 pr., new . . . . . 10.
1268 B, 23 pr., new . . . . . 12.
1269 A, 20 pr., new . . . . . 10.
1435W (1269-A-wood base), new 10.
1435 U, Fuse group, new . . . . . 5.
Heat Coils. 76A, new . . . . . 10¢
Frames, MDF, W.E. & Cook
6 & 8 ft., single or up to 5 verticals in unit—save over half.
FUSES, 35A, B, C, H, S, New, 10¢. ($9 hund., $80 thousand) 75,000 in stock (standard W.E. pack, 10 or 50)

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WE #83A (#84A in wp. mtg. box, 5 pr. block equipped with #26 & #30)
New $5.00—Reconditioned $4.00

"KICK-COILS"

(CB phones to LB SWBD)

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C-111

Ring-thru, 4 section (50 ohms each) 1:1 ratio. Ideal for connecting CB phones to Mag. board using common battery supply.
Also may be used for ring-thru LB cord circuits, isolation, drainage.
New $1.50—Used $1.00

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76A	(two coils) 1:1 rat.	5.00
75A	(better matched)	6.00
91A	(double coil)	10.00
93A, B, F, G		12.50
70A	ring-thru	5.00
27A	non-ring-thru	3.00
25A	two of above	5.00
94E	non-ring-thru	2.50
94G		3.50
94H		5.00
101A		5.00
120C, CS, E, ES		5.00
Retard coils, 149E		3.00
Kellogg—New		
20A Repeating		$2.00
19A Repeating		2.50

Pole Terminals, with lead Stub

W.E. F-10, 5½ ft. stub	$ 6
12 ft. stub	7
F-16, 5½ ft. stub	10
12 ft. stub	12
F-26, 5½ ft. stub (4 for $50) ea.	15
BD-102, cross-conn 51 pr. or terminal 102 pr.	80
BD-404, as above	200
BD-606, as above	250
B-101 (B Box) (Protected, Fuse) 7 amp.	100
EA-26 (Protected) #26-27-30 Blocks	50

A.E. 60A type, 16 pr., 6' stub . . $ 8
26 pr., 6' stub 12

Protected Pole Terminals.
11 pair S-6 Cook, A9—5 amp. Fuses—Tru-gap Dischargers. No stub, for Plastic cable, compression gland. New $19.50

Protected Interior Terminals.

Western Electric—all new. Lead stubs.

LA 11, complete	$40
LA 16, complete	50
LA 26, complete	65
LA 26 (fuse chamber only)	20
with protection	30
LA 51, complete	100
LB 26, fuse chamber only	20
with protection	30
LC 16, complete	45
LC 26, complete	60
LC 51, complete	80

Interior, lead stub

W.E. G-16, bind post chamb.	5
G-26, bind post chamb.	10
H-51, bind post chamb. (12 ft. stub)	20
E-51, 54" stub	25
50 ft. stub	40

Cook Terminals

WXB, 6 pr. (less box) Lead	4
WXB, 16 pr. (with box)	8
M-16, 51 pr.	15
Uniflex, 51 pr.	15
Cable vault, 101 pr.	50
(with H-20 protectors)	100
Terra-Term, 76 pr.	35

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JOURNEYMAN, CABLE SPLICERS, with good records and references. Call or write Mullen Construction Co., Inc., 2002 East Wisconsin Ave., Appleton, Wis. Phone REgent 4-9881 or P. O. Box 356, Newburgh, Ind. Phone UL 3-8931.

CABLE SPLICERS, LINEMAN, Equipment Installers, Station Installers, Outside Plant Engineers, and Inside Plant Engineers. E. & C. Contracting Co., Box 191, Paoli, Ind.

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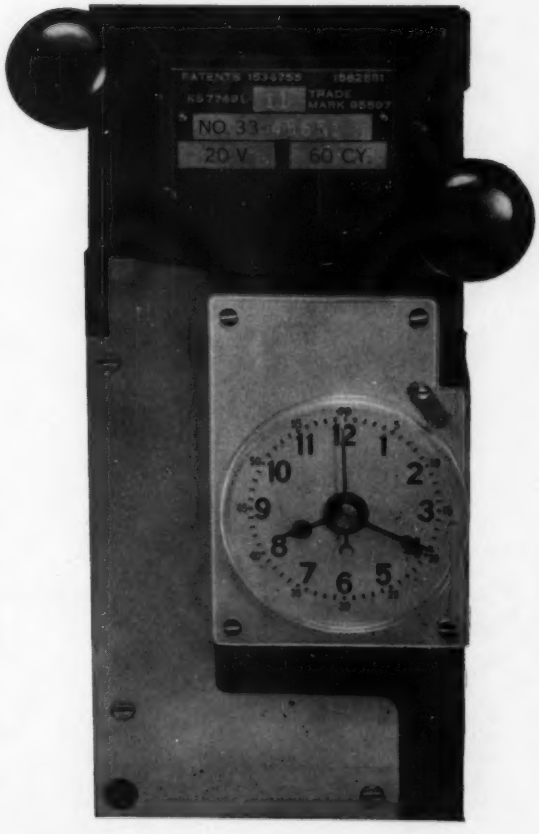

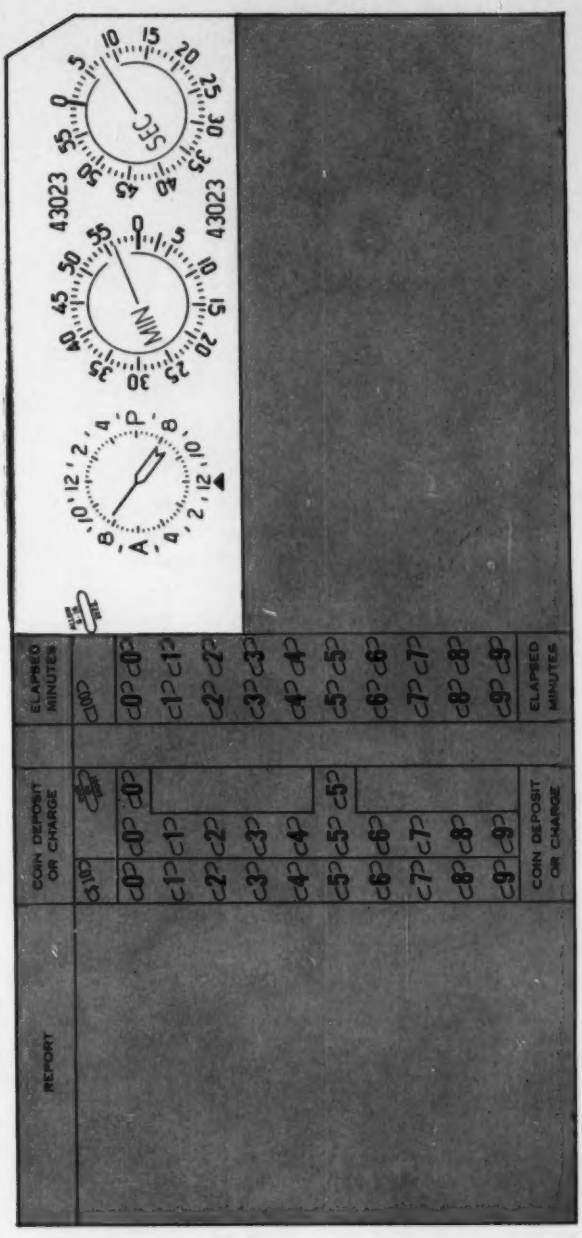

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